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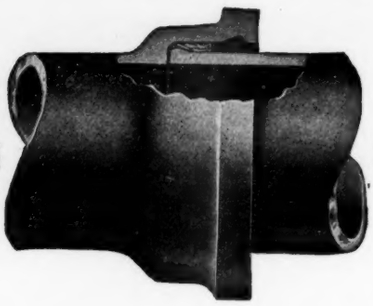

Why the Bell and Spigot Joint?

Taking up The Slack and Stretch

Expansion and contraction, causing a movement of approximately 2½ inches to a mile in underground lines of metal pipe, is an irresistible force which must be accommodated. The hub and spigot, properly caulked with lead, forms an ideal "Expansion Joint" and permits this movement without impairment of the line.

When the Pipe Settles

The 2-inch ring of lead in the bell and spigot joint forms a flexible cushion and permits maximum deflection without leakage.

Eliminating Corrosion

The non-corrosive quality of Cast Iron pipe long ago fixed it as the World's Standard for underground lines. The bell and spigot joint, using only non-corrosive packing material, leaves no "weak link" in these lines.

Making Field Joints

When short lengths are required to meet measurements in the trench, bell and spigot pipe can be cut on the job and a perfect joint easily secured.

A Bit of History

The first Cast Iron Pipe, made 250 years ago, was jointed by means of bolted flanges. The bolts rusted out so rapidly and replacements were required so frequently that although still used extensively for many purposes, the flanged type of joint soon gave place to the bell and spigot for underground work. Since the bell and spigot was devised no replacements have ever been necessary.

The Cast Iron Pipe Publicity Bureau

1 Broadway, New York

Municipal Journal

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USE OF TAR ON HIGHWAYS*

English and American Practice in the Construction of Tar Surfaces and Pavements—Construction Methods and Appliances—Foundations, Road Metal and Construction of Tar Macadam Pavements.

By ARTHUR H. BLANCHARD†

DESTRUCTION OF BITUMINOUS CONCRETE PAVEMENT DUE TO INADEQUATE PROVISION FOR DISPOSAL OF SURFACE DRAINAGE.

TAR SURFACES.

Classification: Tar surfaces may be considered as divided into two classes: Thin superficial coats of tar, with or without the addition of such materials as stone chips, fine gravel or sand. (After one to two years' wear, the road metal or other material composing the wearing course is exposed.) 2—Coats of tarred material of appreciable thickness, usually over ½-inch, formed by the application of one or more treatments of tar with sand, gravel or stone chips added; known as tar carpets or blankets. (They rarely wear down uniformly to the wearing course and hence increase unevenly in thickness by re-treatments.)

Construction: Before constructing a tar surface on a broken stone or gravel road, every precaution should be taken to secure the best subdrainage which is practicable under the local conditions. Also all depressions, potholes, ruts, or other irregularities should be filled with thoroughly compacted tar-coated stone, so that the whole surface of the roadway is even. All surplus dust must be removed so that the larger pieces of broken stone of the roadway surface are exposed but without breaking the bond. This cleaning process is accomplished by the use of horse sweepers and fine bass brooms, of coarse fiber brooms and fine bass brooms, or by a vacuum process. If there is caked mud on the surface of the roadway, wet brushing will prove advantageous.

The character of the cleaned surface will be affected by the original construction of the roadway. If large size stone varying from 1 to 2½ inches in longest dimensions was used for the top course of a broken stone road, and the stone is hard and tough, the desired surface can be secured easily. The surfaces of the large stones in such a roadway are easily cleaned by brushing without the dislodgment of stones in the surface. A clean mosaic surface is of the utmost importance from the standpoint of the formation of a satisfactory bond between the broken stone and the tar. The maintenance of tar surfaces on wearing courses of large broken stone is economical, since after the tar surface wears away in spots, the mechanically interlocked large stones will of themselves generally have sufficient stability to withstand the effects of traffic until re-treated. On the other hand, if the top course of a broken stone road has been constructed of a product varying in size from ¼ to 1¼ inches, it will be very difficult, if not impossible in the case of soft stone, to secure an even, clean surface. Even after thorough brushing, a film of impalpable dust usually covers the surface of the roadway. During hard brushing small depressions will probably be formed by the displacement of pockets of dust and the smaller sizes of stone. Furthermore, the wheels of vehicles may adhere to the tar and thus tear up the small mineral matter adhering to it. As soon as the tar surface wears out in

*Paper before the Fifth Canadian Good Roads Congress at Hamilton, Ont., on May 8, 1918, slightly condensed.
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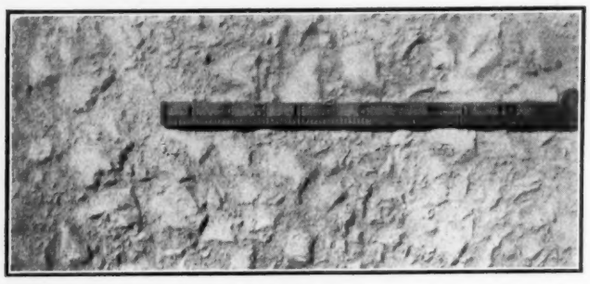
TYPES OF BRUSHES USED IN CLEANING MACADAM SURFACES PREPARATORY TO CONSTRUCTING A TAR SURFACE. LEFT—RATTAN. RIGHT—BASS.

spots, rapid disintegration of the exposed broken stone or gravel surface, with the consequent formation of potholes, is apt to occur.

If a tar surface is to be constructed on a new broken stone or gravel road, or on one which has just been resurfaced, the tar should not be applied until the crust has had time to consolidate under the action of traffic and with the aid of the binding action of dust and moisture. If it is impracticable to postpone the surface treatment, special care should be taken to secure a maximum consolidation of the crust of the roadway by puddling and rolling.

When the tar is being applied the roadway surface should be bone dry. If the surface is damp it will be difficult to secure a good bond. The tar may be dis-



SURFACE OF WELL CONSTRUCTED BROKEN STONE FOUNDATION.

tributed either by gravity or by mechanical pressure. The use of gravity distributors has not been developed to its fullest extent in America, in that the use of mechanical brushes or the brushing of the material into the road by hand brooming has never been adopted extensively. By brushing after gravity distribution, it is possible to distribute uniformly one-quarter to one-fifth gallons of tar per square yard. In some cases, when the distribution is accomplished by hand brooming, the adhesion of the material to the road metal is as good as when the material is applied under pressure. The advantages claimed for pressure distributors are: aid in cleaning the surface of the roadway, even application, distribution of small amounts per square yard, satisfactory adhesion obtained between the tar and the surface of a clean, dry roadway, and rapid and economical distribution.

As a general rule from ¼ to ½-gallon per square yard is used for the first treatment, preferably in two applications. The amount applied per treatment depends upon the kind of tar, the character and condition of the surface, and the details of the method of application. For example: A smooth surface composed of large sized, tough, hard stone and well compacted by traffic, would require from 0.25 to 0.35 gallon; for a somewhat rough surface of stone having a medium toughness and hardness and recently re-surfaced, it would be necessary to use from 0.35 to 0.5 gallon per square yard to form a satisfactory thin tar surface.

The superficial coat of tar is usually covered with either coarse sand, fine gravel, or stone chips varying from ⅛ to ½-inch in longest dimensions. Material containing clay should not be used, as disintegration may result by the emulsifying of the clay and water on the tar surface. The amount of sand, stone chips, or gravel used per square yard depends upon the quantity and kind of the tar, and the character of the surface of the roadway. From 5 to 20 pounds per square yard have been used satisfactorily for thin tar surfaces; 5 to 12 pounds for from 0.1 to 0.25 gallon of tar per square yard; 10 to 17 pounds for 0.25 to 0.35 gallon; and 15 to 20 pounds for from 0.35 to 0.5 gallon.

Cost Data: Under normal conditions, with labor and foreman at $2.00 and $4.00 respectively for an 8-hour day; teams $5.00 per day; refined tar applied, 7 to 9 cents per gallon; and top covering $2.00 to $2.25 per ton delivered; the cost of tar surfaces, using from 0.25 to 0.4 gallon of tar per square yard, will vary from 4 to 8 cents.

TAR MACADAM PAVEMENTS.

A tar macadam pavement is one having a wearing course of macadam with the interstices filled by a penetration method with a tar cement.

Foundations: Usually tar macadam pavements are constructed on broken stone or gravel foundations. In cases where traffic conditions require rigid foundations or where materials satisfactory for cement-concrete may be secured at a much lower cost than broken stone, cement-concrete foundations have been used and have been found to be satisfactory and economical. The more general use of cement-concrete foundations is advisable on trunk or other highways where traffic is liable to increase rapidly, both in amount and weight. When it is necessary to construct a more durable type of wearing course than tar macadam, the cement-concrete foundation previously constructed proves a valuable asset and allows reconstruction to be accomplished economically.

Physical Properties of Road Metal: The weight to be given to toughness and resistance to abrasion depends primarily upon the traffic to which the pavement will be subjected and the details of the method of construction adopted. For example, for many highways serving as feeders to state trunk routes, a rock having a toughness of not less than 6 and an abrasion loss of not more than 6 per cent. would prove economical and satisfactory; but if used on state trunk highways subjected to horse-drawn or motor trucks, rock having a toughness of not less than 13 and an abrasion loss of not more than 3.5 per cent. should be employed. In cases where rock with suitable toughness and wearing quality is not locally available, satisfactory results may be obtained by im-

EXAMPLE OF POOR PRODUCT OF BROKEN STONE FOR WEARING COURSE OF TAR MACADAM PAVEMENT.

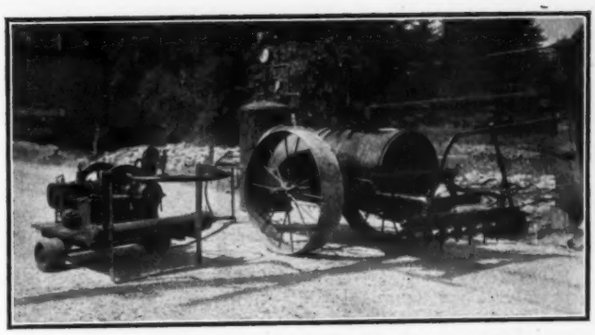
porting the broken stone for the surface of the pavement and using local rock for the lower part of the crust.

In order that road metal should interlock during compaction and thus provide a stable wearing course, a proper angularity is an important prerequisite. The road metal should not contain over 5 per cent. of particles having small acute angles, nor should the product contain slivers. Road metal which has a rough or coarse grain or pitted surface is preferable to material with smooth or glassy surfaces, as the tar cement adheres more satisfactorily to the former than to the latter. Cleanliness is an essential quality of road metal for the wearing course of tar macadam pavements. It is difficult and usually impossible to secure a good adhesion of the tar cement to road metal which is not clean.

Construction: In the construction of tar macadam pavements it is desired to secure, (1) a stable wearing course consisting of broken stone or similar material thoroughly rolled so that it will be well compacted and keyed together and with the several sizes of material uniformly distributed, and (2) a uniform distribution and penetration of the tar within the upper 1½ to 3 inches of the crust. Several methods of construction have been devised with a view to meeting the above prerequisites. Careful supervision, based on experience, is necessary to prevent non-uniformity in the density of the wearing course of broken stone and in the amount of tar applied per square yard. It is evident that uniform application of the tar will depend upon the method of distribution employed. In using vehicular distributors, one cause of uneven distribution of the tar is overlapping of applications. The use of strips of tar or wrapping paper, from 3 to 5 feet in width, placed at the edge of an application has prevented sections of the wearing course receiving double the amount of tar cement specified.

A typical American method of construction is as follows: The metalling of the wearing course is a uniform product of about 1 or 1½ inches in size or a product similar to or larger than one passing over a 1½-inch and through a 2½-inch screen, and the voids in the upper part of the wearing course are filled after the tar is applied. Practice varies with reference to the amount of rolling of the wearing course prior to the application of the tar cement. For traffic medium or heavy in weight and amount, the best results have been secured by thoroughly rolling the road metal and thus securing maximum interlocking of the particles and thereby securing the highest degree of stability practicable by this method. The tar cement is applied in an amount varying from 1½ to 2 gallons per square yard, after which ⅜-inch stone chips or a product similar to one passing

HAND SPRAYING OF TAR BY BRITISH ENGINEERS.



HAND-DRAWN AMERICAN PRESSURE MACHINE.

a ½-inch and through a 1-inch screen is spread and thoroughly rolled. Usually the surface is then broomed with stiff brooms, removing the excess loose broken stone, and another coat of tar cement from one-third to one gallon per square yard, is applied, covered with a layer of stone chips or pea gravel and rolled.

A tar macadam pavement called "Pitchmac" by its inventor, J. A. Brodie, city engineer of Liverpool, has been used to a considerable extent in England and has been adopted as a standard type by the Road Board of England. It is constructed on a foundation of stone. The wearing course of broken stone varies from 2 to 4½

FRENCH PRESSURE DISTRIBUTOR IN USE ON ARC DES BOIS DE BOULOGNE.

inches in depth, dependent upon traffic conditions. If the wearing course is from 2 to 3 inches in thickness, it is constructed in one layer, and if from 4 to 4½ inches, in two layers. The single layer and, in the case of two layers, the upper layer is composed of broken stone ranging in size from 1¼ to 2½ inches. After thorough rolling the tar compound is applied to the single layer or to each of the layers of the two-layer wearing course. The tar compound used in England consists of hot sand mixed with tar pitch. From 1¼ to 2 gallons per square yard are used for the one-layer wearing course and from 3¼ to 3½ gallons for two layers. To assist in completely filling the voids, chips varying in size from ⅜ to ¾ inch, are applied during the rolling of the tar-grouted layer. The oldest sample of Pitchmac in Liverpool was laid in Princes avenue, in 1901, near the end of Eversley street, and has been in continuous use ever since without repair. This avenue carries a large volume of light motor and carriage traffic, as well as some of a heavier character, the traffic amounting to 120,000 tons per yard width per annum.

Pitchmac has been used to a limited extent in Massachusetts. The writer is indebted to Arthur W. Dean, chief engineer of the Massachusetts Highway Commission, for the following authoritative and instructive data covering the cost of construction and maintenance of Pitchmac pavements having top courses of 2 inches filled with tar and sand and foundation courses of 4 inches of broken stone.

Cost of Constructing and Maintaining Pitchmac Pavements.

Massachusetts Roads.	Year of Construction.	Cost of Construction.	Maintenance Cost per Square Yard.	Condition in 1918.	Traffic Conditions.
Tyngsboro W.	1913	$1.01	$0.0118	Good	Medium
Natick E.	1914	1.12	0.0191	Good	Heavy
Newton	1914	1.21	0.0118	Good	Medium
Reading S.	1914	1.18	0.0266	Good	Very heavy
Wayland	1914	1.46	0.0175	Good	Very heavy
Gloucester W.	1915	1.15	0.0141	Good	Medium
Boston	1916	1.20	0.0000	Good	Heavy

Notes: The character of traffic on the several sections is as follows:

Tyngsboro W. Heavy Pleasure travel, truck and logging teams, in Spring and Fall.

Natick E. Pleasure cars, trucks, between Framingham and Boston.

Newton. Pleasure cars 70 per cent, 15 per cent trucks, 15 per cent teaming.

Reading S. Pleasure cars. Very heavy trucking.

Wayland. Pleasure cars. Very heavy trucking.

Gloucester W Pleasure cars 80 per cent, trucks 10 per cent, teams 10 per cent.

Boston. Mostly trucks and teaming, pleasure cars 30 per cent.

Notes: Maintenance cost is average per square yard per year since surface was laid and with exception of Reading S. is entirely for sanding. There having been no repairs made or necessary, nor probably will be for some years. At Reading the contractor had poor workmen and early corrections were necessary on that account. The sanding was necessary mostly on account of surplus tar on surface and perhaps 25 per cent for slipperiness during cold weather. Notice no repair expenses at Boston, due to perfect workmanship. This is partly the result of experience, as it is the latest piece laid and can be equalled under favorable conditions.

Distributors: The appliances used in the distribution of tar cements may be classified as gravity distributors and pressure distributors. The market is supplied with so many different types, that a thorough investigation should be made preceding the purchase of a machine. The following factors should be given consideration when selecting a distributor: (1) character and range of work upon which the distributor will be used; (2) present and probable requirements in specifications pertaining to type and details of distributors and the work to be done; (3) different types and grades of tar cements which the machine will distribute, and the range in the amount per square yard which can be applied; (4) gravity or pressure distribution, and, if the latter, the range in pressure per square inch; (5) method of controlling uniformity and amount of distribution; (6) accessories of distributors for heating material, recording temperature of tar cement, amount in tank, and amount of pressure, and shutting off tar cement at end of run; (7) width of distribution and means for modifying same; (8) motive power; (9) width of tires and loads per linear inch of tires when tank is full; (10) ease of operation and repair; (11) structural strength; (12) amount and character of labor required to efficiently operate the distributor; (13) economics, including overhead, operation and maintenance charges.

Cost Data: The cost of tar pavements built by penetration methods varies with the amount and kind of tar cement and road metal used, and the method of construction employed. An average cost, using 6 to 8 inches of compacted broken stone and a total of 2 to 2¼ gallons of tar cement per square yard, varies from 25 to 40 cents per square yard in excess of the cost of waterbound broken stone roads, or from 70 cents to $1.25 per square yard.

THAWING AT MIDDLETOWN, CONN.

The method employed at Middletown, Connecticut, for thawing fire hydrants is unusual, we believe, and has been described for us by the superintendent of the Water Department, Edwin T. McDowell, as follows:

The machine used was a 30 h. p., 4-cylinder Federal fire truck. The exhaust muffler was removed from the truck and the ends of same used as companion flanges to fasten a piece of 2-in. galvanized pipe about 12 in. long to the end of the cast-iron exhaust pipe. This short piece of pipe was connected (by means of a union and elbow, to insure easy removal) to another piece of 2-in. galvanized pipe about 4 ft. long, which can be plainly seen in the accompanying picture. At the end of this pipe was connected a piece of ¾-in. hose about seven or eight feet long by means of a special coupling.

The end of this hose was inserted in the hydrant to be thawed, as shown in the picture, the end being forced down the barrel until it touched the ice in same. The engine was then started and the hot exhaust carried by the hose to the frozen parts of the hydrant thawed out same in a very short time. In case the hydrant was frozen for a short distance at the bottom only, the apparatus usually thawed it in three or four minutes; but in some cases where the hydrant barrel contained a considerable amount of ice, a correspondingly longer time was required. The most stubborn case—a two-way hydrant which was entirely filled with ice from the bottom to the nozzle—required about 18 minutes.

Our apparatus for thawing water mains and services was very simple and was all mounted upon a one-ton Buick truck belonging to this department. It consisted of a 25 K. W. transformer with which we reduced the 2,300-volt A. C. current from the primary power wires in the street to about 50 volts, an instrument board upon which was mounted an ammeter to indicate the amperage being used, and a water rheostat for controlling the current. The water rheostat was home-made and consisted simply of two flat coils of heavy copper wire and a barrel filled with salt water. One terminal of the rheostat was connected with a flat coil of heavy copper wire which was laid in the bottom of the barrel. The other terminal was connected to a similar coil, which was supported by means of a vertical rod from a cross piece at the top of the barrel. By means of an adjustable thumb screw the rod supporting the upper coil could be raised or lowered and the distance between the two coils varied. In this way the resistance of the water to the electric current

THAWING FIRE HYDRANT WITH EXHAUST FROM FIRE TRUCK.

passing through it could be increased or decreased at will and the current controlled accordingly.

About 115 services and several short lengths of cast iron mains in various sizes up to 6 in. diameter were thawed by this apparatus and without a single failure. The water rheostat heated up very quickly and boiled, but this was overcome by shoveling snow into the barrel occasionally. The current used was about 350 to 400 amperes.

WATER WORKS OPERATION—DISTRIBUTION SYSTEM

Every Valve Should be Inspected After Each Use and at Regular Intervals—Points Inspection Should Cover—Defects and Remedies.

INSEPECTION AND MAINTENANCE OF VALVES.

Even more important than knowing where valves are located is having them always in serviceable condition. A valve whose location is unknown might just as well not be there; but one that is in poor condition might much better not be there, for it may be leaking and thus waste water and weaken the support of the main, or it may be closed and thus reduce the head and discharge capacity of the system during fires, or it gives a sense of security that is false and may lead to serious delays and enormous damage when an emergency demands its use. A soldier who goes on guard duty without being sure that his gun barrel is not foul and mechanism rusty runs no more risk than a water works superintendent who is uncertain as to the condition of his valves and hydrants.

He can know the condition only by inspecting them at sufficiently frequent intervals. A large percentage of superintendents report that they inspect valves once a year and hydrants more frequently, a considerable number inspect valves twice a year, and some at shorter intervals. There are altogether too many, however, who make no systematic inspection whatever.

In the first place, a valve should be inspected by a reliable and experienced man immediately after every use of it. There are several reasons for this. With very few exceptions "using" a valve means closing it. Was it opened again? It does not do to take this for granted or accept the assurance of a man who was probably excited by the emergency that called for its use. Score of instances, if not hundreds, could be cited of valves found closed when they were supposed to be open. Again, the use of the valve may have twisted, buckled or broken the stem, jammed the gate, started a leak in the stuffing box, or otherwise put the valve out of condition; and this should be learned and rectified at once. On account of the possible excitement of the superintendent himself or his assistant caused by the break in the main or other reason for closing the valve, it is a good plan to have every valve that could possibly have been used examined one or two days after the emergency has passed, when every one is calm and has time to do so thoroughly.

In addition to these special inspections, each valve should be regularly inspected at least once a year. In the North, this annual inspection should be in the fall or early winter so as to prevent, as far as possible, the necessity of making repairs when the ground is frozen and covered with snow. As the low temperature may have injuriously affected the valve or box, it is also well to make spring inspections of the valves.

Inspection should include checking up description of location of valve box; noting whether top of box is flush with street surface and vertical, whether box cover sits firmly in place and is not dislodged by wheels, and whether the box is free from all dirt and the stem nut readily reached by the key. The box should be free of water (the freezing of which in winter would seriously delay use of the valve). There should be no leakage through the stuffing box, at the bonnet or throat flange or elsewhere around the valve. The key should fit easily but securely on the stem nut and the nut be fastened securely and firmly in place. The stem should turn easily in either opening or closing the valve, and it should be ascertained that it raises the gate when supposed to be doing so.

If the top of the box is below the street surface it causes a depression objectionable to traffic, and may become covered with dirt that makes it difficult to find or get at. If it extends above the surface it is dangerous to traffic and may be damaged by it, and is liable to be pushed out of plumb unless the street has a firm pavement. If out of plumb, it is not easy and may be impossible to get the key well onto the stem nut. When embedded in a concrete pavement or pavement base, the top of the valve box is sometimes moved by expansion movement of the concrete. Appreciable movement from this cause is infrequent, however; but when it becomes considerable should be corrected by cutting out the concrete and straighening the box.

Some box covers do not seat solidly and for this or other reason can be jarred out of place by traffic. Also because they are not supported around their circumference or are too light, they are sometimes broken. If this is found to occur, a change should be made in the kind of box. A broken or displaced cover is not only a danger to traffic but permits dirt to enter the box.

Dirt in the box means something wrong, and that something should be discovered and remedied. The dirt can be removed by an iron spoon similar to but larger than those used by drillers for cleaning out drill holes in rock. Or it can be washed out by use of a garden hose attached to a hydrant or a hand pump, the discharge end of the hose being pushed down into the box and the water washing the dirt onto the street surface.

Sometimes a main is of necessity laid below ground-water level, in which case water will stand in the valve box. Apparently the only remedy here is to make a water-tight box, enclosing the pipe and rising above the water level. Such a box may be of cast iron, a sleeve at each side fitting over the pipe and the joint between the two being leaded and calked. Concrete may be used and the box cast in place, but great care is required to secure concrete that is water-tight; even slight seepage may fill a box in a few weeks or months.

Where the ground water is below the pipe, water in the box arouses suspicion that the valve leaks, and the cause of the water should be satisfactorily determined. If it comes through the stuffing box or the throat flange, it may be possible to remedy it by tightening up the follower bolts or throat flange bolts. For this purpose it is desirable to have a key that will fit these bolts so that the tightening can be done without digging down to the valve. However, the follower bolts should not be tightened so much as to make the stem work hard, and it is a good rule never to tighten them without first removing the follower and putting in new packing that gives good lubrication. Then send the follower down snug and raise and lower the gate a few times; adjusting the follower screws of the stuffing box until there is no leakage and at the same time the stem works easily.

Having an easily working stem is very important. Numbers of valves have been damaged by too much muscle applied in an attempt to open or close them. All valves should work easily and employees be instructed never to

CLEANING MAINS, LEAKAGE AND METERS (Continued).

City and state	Do mains need cleaning at intervals?	Method of cleaning	Methods of detecting and preventing leakage and waste	Is leakage enough to make radical action desirable?	Percentage of services metered	Owner of meters*
Massachusetts (Continued):						
Reading	No	.....	.....	No	96	City
Saugus	....	.....	.....	No	30	Consumer
Spencer	No	.....	Inspection	No	95	City
Springfield	....	.....	.....	....	100	Consumer
Taunton	Probably	Flushing	None	No	62	Consumer
Turners Falls	No	.....	None	Yes	7	Both
Walpole	No	.....	Inspection	No	80	City
Waltham	Yes	.....	.....	No	62	City
Wellesley	....	Not cleaned	Ventura meter	No	100	City
Weymouth	No	.....	Pitometer, hose & meter	Yes[m]	50	City
Michigan:						
Albion	No	.....	None	No	72	City
Alma	No	.....	Leak detectors	No	95	City
Battle Creek	No	.....	Inspection	No	97	City
Big Rapids	No	.....	None	....	2	City
Coldwater	No	.....	None	No	None	.....
Crystal Falls	No	.....	Telephone receiver	No	1	City
Grand Rapids	No	.....	Inspection	Think not	Most	City
Hastings	....	Flushing	None	No	50[l]	Both
Highland Park	Yes	Flushing	Surface inspection	No	7	Consumer
Houghton	No	.....	Aquaphone	No	100	Consumer
Iron Mountain	No	.....	Listening gates and hydrants	No	45	Both
Ishpeming	No	.....	.....	No	95	City
Jackson	No	.....	Meters	Perhaps	95	City
Manistee	Yes	Flushing	Inspection and leak locator	No	53	City
Marquette	No	.....	Surface inspection	No	50	City
Mt. Clemens	No	.....	Meters	....	99	City
Muskegon	....	None yet	.....	No	75	.....
Paw Paw	Yes	Flushing	.....	No	100	Consumer
Petoskey	Yes	Flushing	None	No	75	City
South Haven	No	.....	Meters	No	88	City
Traverse City	....	Flushing	.....	No	50	City
Yale	....	.....	Inspection	No	7	City
Ypsilanti	No	.....	None	....	62	City
Minnesota:						
Eveleth	....	Flushing	None	No	2½	Consumer
Fairmont	No	.....	Meters	No	100	Consumer
Lake City	No	Flushing	Sonoscope	No	100	.....
Moorhead	Yes	Flushing	Darley leak locator	No	....	City
St. Paul	No	.....	Inspection	No	91.2	City
Willmar	No	.....	.....	No	100	Consumer
Mississippi:						
Vicksburg	Not yet	.....	Aquaphone, inspect. & meters	No	25 to 30	Both
Water Valley	Yes	None yet	None	No	100	City
Missouri:						
Albany	No	Flushing	None	Probably	100	Both
Boonville	Yes	Flushing	None	Think not	60	City[g]
Carrollton	Yes	By contract	.....	No	95	Company
Farmington	No	.....	.....	No	100	Consumer
Fulton	No	.....	No special method	No	50	Consumer
Trenton	No	.....	Meters	No	100	City
Washington	No	.....	.....	....	65	Consumer
West Plains	No	.....	.....	No	95	Consumer
Montana:						
Billings	Yes	Not cleaned	Surface inspection	Think not	65	City
Bozeman	Yes	Flushing	.....	Yes[n]	5	Consumer
Havre	No	.....	Surface indications	No	20	City
Helena	No	.....	None	Think not	10	City
Kalispell	Yes	Flushing	Inspection	No	80	Consumer
Libby	No	.....	None	No	None	.....
Livingston	No	.....	Inspection	No	5.5	Company
Nebraska:						
Alliance	No	.....	.....	Yes	100	Consumer
Aurora	....	Never done	Surface inspection	Yes	90	Consumer
Grand Island	No	.....	.....	No	100	Consumer
Hastings	No	.....	.....	No	100	Consumer
Omaha	Yes	None cleaned	None	No	86	Consumer[o]
Schuyler	No	.....	None	Think not	100	City
New Hampshire:						
Berlin	No	.....	None	No	20	Company
Claremont	No	.....	Meters	No	75	Company
Concord	....	Flushing	Venturi meter	No	68	City
Dover	Possibly	Not done	None	No	79.5	Both
Franklin	No	.....	Listening apparatus	No	100	City
Lebanon	....	Never done	.....	No	43	Both
Milford	No	.....	House inspection	No	50	City
Newport	No	Flushing	Surface inspection	No	Very few	City
Rochester	No	.....	Leak detector	No	72	Both
New Jersey:						
Atlantic City	Yes	Flushing	Surface inspection	No	99	City
Bridgeton	No	Never cleaned	Inspection	Think not	none	.....
Dover	No	.....	.....	No	76	City
Hawthorne	No	.....	None	No	50	City
Helmetta	No	.....	Pressure gauge	No	All domestic	Company
Irvington	No	.....	Inspection	No	90	.....
Milltown	....	.....	Meters	No	100	City
Newton	....	Flushing	None	No	70	City
Nutley	No	.....	Pitometer last fall	Not now	100	Consumer
Jamesburg	....	.....	None	No	30	Company
Pleasantville	No	.....	None	u	60	Company
Princeton	No	.....	.....	No	100	Company
Rahway	No	.....	Inspection	No	7	City[k]
Wallington	No	.....	None yet	Think not	20	Company

* The word "city" is used to designate municipalties of any nature or water districts; i—approximate; k—consumer owns sizes larger than ⅝ inch; u—large amount of leakage from wood pipes.

METERS. RATES. MUNICIPAL USE. (Continued)

City and state	Is deposit on meter required?	Is rental charged for meters? †	Does city obtain water without payment?	Use made of free water	Used for Municipal Purposes: Percentage	Used for Municipal Purposes: Is any of it metered?
Massachusetss (Continued):						
Reading	No	No	Yes	.....	.....	All buildings
Saugus	.....	No	No	.....	.....	All buildings
Spencer	.....	No	Yes	Schools, public buildings, flushing sewers and streets, water troughs, fire	.....	No
Springfield	.....	.....	Yes	All city uses	4.8	17%
Taunton	.....	.....	Yes	All but public buildings	.....	Buildings
Turners Falls	No	Yes	Yes	Sprinkling streets, buildings, fire	.....	1 school
Walpole	No	No	Yes	Drinking fountains and fire	5 to 10	All buildings
Waltham	No	No°	Yes	Fire	.....	All buildings
Wallesley	No	No	Yes	Street sprinkling and fountains	20	Schools
Weymouth	No	No	Yes	Fountains and fire	.....	Schools
Michigan:						
Albion	No	Yes	Yes	Fountains and fire	5	Some schools
Alma	No	No	Yes	Street and sewer flushing	5	Schools
Battle Creek	No	Yes	Yes	Parks, fountains, streets, sewers, buildings	20	Very little
Big Rapids	No	Yes	....	.....	15	No
Coldwater	.....	.....	No	.....	20	No
Crystal Falls	No	No	No	.....	.....	.....
Grand Rapids	.....	$2	No	.....	.....	Most
Hastings	No	Yes	Yes	Street and sewer work and parks	4	No
Highland Park	.....	.....	Yes	Schools and street sprinkling	.....	Schools
Houghton	.....	.....	No	.....	35	No
Iron Mountain	No	No	Yes	Schools and city buildings	10	All
Ishpeming	No	No	No	.....	10	School
Jackson	Yes	No	Yes	Street uses, fountains, etc.	5 to 6	Some
Manistee	.....	No	Yes	Flushing sewers, fountains, hospital		Fountains and hospital
Marquette	.....	No	Yes	Fire houses and park	.....	City Hall
Mt. Clemens	$3	No	Yes	Sprinkling and fires	25	Schools
Muskegon	.....	$1.00	Yes	.....	.....	No
Paw Paw	.....	.....	....	.....	.....	.....
Petoskey	No	$1.20	No	.....	10	All buildings
So. Haven	No	Yes	....	.....	4	All but hydrants and flush tanks
Traverse City	.....	$1.00	No	.....	.....	.....
Yale	No	Yes	No	.....	.....	Schools
Ypsilanti	.....	$1.00	No	.....	8	All
Minnesota:						
Eveleth	.....	.....	No	.....	30	.....
Fairmont	No	$1.00	Yes	Streets and sewers	30	No
Lake City	.....	Yes	.....	City Hall, parks, fire	17	All but flushing and fires
Moorehead	By renters	$3f	No	.....	.....	School
St. Paul	No	No	No	.....	1	Very little
Willmar	.....	.....	Yes	Flushing sewers	10	No
Mississippi:						
Water Valley	No	No	Yes	Street sprinkling and bldgs.	20	School
Vicksburg	Yes	Yes	Yes	Flushing, fire, etc.	20	Yes
Missouri:						
Albany	No	Yes	Yes	Street flushing and fountains	5	No
Boonville	.....	No	Yes	All public uses	.....	Schools
Carrollton	No	Minimum charge	Yes	Sewers, street cleaning, water troughs	10	No
Farmington	.....	.....	No	.....	.....	.....
Trenton	By renters	.....	Yes	Sprinkling, city buildings and fire	3	Yes
Washington	No	No	Yes	Flushing streets	5	No
West Plains	.....	.....	Yes	Water troughs	10	No
Montana:						
Billings	Yes	No	Yes	All city uses	.....	No
Bozeman	No	Minimum charge	Yes	City Hall and fire stations	13	Schools
Havre	No	Min. charge	Yes	Flushing sewers and streets, fire	10	Schools & library
Helena	$10	Yes	Yes	Irrigation and fire	.....	No
Kalispell	.....	.....	No	.....	10	Schools and sprinkling
Libby	.....	.....	No	.....	5	No
Livingston	No	No	Yes	City buildings and sewers	.....	No
Nebraska:						
Alliance	.....	.....	Yes	Parks, public buildings, sprinkling, flushing sewers, fountains, fire	30	No
Aurora	No	No	....	.....	.....	Schools
Grand Island	.....	.....	No	.....	.....	All
Hastings	.....	.....	Yes	Sewers, parks, fire	15	No
Omaha	.....	.....	No	.....	5	All but flushing street and sewers
Schuyler	No	No	No	.....	25	No
New Hampshire:						
Berlin	Sometimes	Yes	Yes	Flushing	.....	Schools
Claremont	No	No	No	.....	.....	.....
Concord	.....	No	Yes	Municipal buildings, street watering, fire	.....	No
Dover	No	Yes	No	.....	.....	All but street, sewers and fires
Franklin	No	No	No	.....	.....	.....
Lebanon	No	Yes	Yes	Sprinkling streets, schools, fountains, fire	.....	No
Milford	.....	.....	No	.....	.....	All
Newport	.....	.....	Yes	Public buildings, flushing sewers, cemeteries, fire	25	No
Rochester	No	Yes	Yes	City sprinkling and public buildings	5	No
New Jersey:						
Atlantic City	No	No	Yes	All municipal uses	.....	No
Bridgeton	.....	.....	Yes	Flushing streets and sewers, public buildings, fires	10	No
Dover	No	No	Yes	Water trough and fire	.....	No
Hawthorne	No	Yes	No	.....	.....	Yes

† Amounts given are annual rentals, in some cases reported as quarterly or monthly payments; f—Monthly payments until meter is paid for.

use much strength in turning the key. A good plan is to use keys that are not strong enough to break a well-constructed valve but will twist themselves first.

Effort to open a valve already open or close one already shut may result in breaking the stem from the gate, causing the latter to keep the valve always closed. The stem may revolve, however, giving the impression that the valve is being opened and closed. This can be determined by listening for the "singing" of the water when the gate is presumably nearly shut. If there is no singing, conditions should be investigated by removing the packing plate and pulling up the stem, or by removing the bonnet. (This will of course be preceded by shutting off pressure from the valve.) If conditions of the distribution system permit, it may be possible to determine whether the gate is loose by opening a fire hydrant on the main affected by the suspected valve and closing all other gates affecting flow to this hydrant; then determining whether the suspected gate can be used to start and stop flow from the hydrant.

It should also be learned whether each gate seats so as to close the valve completely. This can generally be ascertained by listening for the singing as the gate closes, which singing will become entirely inaudible, even through an aquaphone, if the valve closes tight. If it does not close tight because of sediment in the bottom of the case, this can often be removed by opening a near-by fire hydrant and closing the valve slowly when near the bottom, causing the high velocity under the gate to wash out the sediment.

In the annual or semi-annual inspection, even if all of the tests named above meet requirements, the packing should be renewed on general principles and the gate raised and lowered until it works easily and it is certain that the stuffing box is water-tight. And there should be no question whatever that the gate is left wide open, except in the occasional cases where it is supposed to be kept closed.

CONCRETE SIDEWALKS WITHOUT CINDER BASE.

The idea of building concrete sidewalks without cinders or other materials as a base between them and the ground has been advocated by contributors to Municipal Journal, but the idea has not been generally adopted, nor on the other hand has it been abandoned. It is, therefore, a subject for discussion and one concerning which arguments pro and con are of interest. Writing to the Concrete Highway Magazine, the organ of the Portland Cement Association, M. R. Thayer, says:

One of the important engineering problems today is better sidewalk construction at less cost. Instantly the problem resolves itself into this question, "Where can a material saving be made, consistent with best results?"

It is a common practice to dig a trench in the soil, disturbing that which is already a firm, uniform base, and then fill the trench with ashes, cinders, brick bats, etc., for a so-called "drainage," with no provisions whatever in most cases for an outlet.

With the coming of cement into general use the sidewalks of the country today have undergone a rapid change from timber to concrete. This has taken place without agitation on the part of any one, as concrete has adapted itself so perfectly and readily to this use.

If a cinder base must be used, permanent outlets for drainage should be provided. The best grade of clinker cinder made cannot be packed tight enough in a short time, by either rolling or wetting, or both. Their corners are too rough, and when they do become tight enough they will have distintegrated and shrunk, thereby causing uneven settlement. The large per cent of voids in the cinders, because of their inability to make them lay close together, due to their rough corners, hold a quantity of water, especially when placed in a trench without drainage, and during freezing weather expand by virtue of the amount of water contained in the voids.

In this case we have a slab on a base with maximum movement. Is it any wonder they fail when we consider the weakness of poorly mixed concrete and a porous base course which cannot possibly hang together and resist the subgrade gymnastics? The argument that a cinder sub-base does not prevent cracks and that dispensing with it does not increase the cracking seems to be justified.

The writer has had to do with a considerable amount of walk construction of the two-course type. No walks were wider than 6 feet, nor thicker than 4 inches. Some were placed on cinders and drained, and others were placed on earth, with but the usual drain or slope of the parking for a drain. Some were built upon tight clay soil and others upon loose timber soil. The results prove that a sub-base is not essential to construction but stability and strength are, for by having a concrete well mixed, to a proper consistency, made dense by rolling and of a one-course construction even of a larger coarse aggregate, a better walk would be obtained. When this is specified and placed directly on the earth of uniform compactness and sufficiently drained, no fear need be felt of frost action or weak base, for the action of frost, so detrimental, will have been lessened and the slab made much stronger to overcome what action the frost may have on walks 4 to 5 inches thick up to 6 feet wide, since there will be only a small amount of moisture in the soil.

NATIONAL CONFERENCE ON WAR ECONOMY.

On Wednesday and Thursday of next week, June 5th and 6th, there will be held at the Hotel Astor, New York City, a "National Conference on War Economy," under the joint auspices of the Academy of Political Science and the Bureau of Municipal Research, with the cooperation of the National Municipal League. Sessions will be held Wednesday evening and Thursday morning, afternoon and evening; in addition to which the National Municipal League will hold its annual meeting in Greenwich Village Wednesday morning and afternoon, the morning session being a joint one with the Governmental Research Conference, and the Civic Secretaries' Conference meeting with the League in the afternoon. At these sessions the League will discuss, among other topics, Federal Relations to American Municipalities, War-Time Work of Civic Organizations, What Are Necessary Municipal Improvements, and The City Manager Plan as a War Measure.

The topic of the first session will be "Executive Leadership in Democracy," at which session several governors will speak of the war work of their respective state governments. The second session will be devoted to a discussion of "War Economy in Financing Local Governments" by Charles L. Craig, comptroller of New York, Paul M. Warburg, vice-governor, Federal Reserve Board, and Andrew J. Peters, mayor of Boston. "The Government as Employer" will be the topic Thursday noon at a luncheon meeting, discussed by labor leaders and government officials. Thursday afternoon the "New Era in Budgets" will be the subject of addresses by W. F. Willoughby, Arthur N. Pierson, Frank O. Lowden, Emerson C. Harrington and Prof. Howard L. McBain. On Thursday evening a joint dinner conference will be held to discuss "New Duties of City and State Governments in War Times."

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Subscribers are requested to notify us of changes of address, giving both old and new addresses.

Contributed Articles and Reports.

Contributions suitable for this paper, either in the form of special articles or as letters discussing municipal matters, are invited and paid for.

City officials and civic organizations are particularly requested to send to Municipal Journal regularly their annual and special reports.

Information Bureau.

Municipal Journal's Information Bureau, developed by twenty-one years' research and practical experience in its special field, is at the command of our subscribers at all times and without charge.

MUNICIPAL YEAR BOOKS.

The Bureau of Municipal Research of Philadelphia (the purpose of which is "To promote efficient and scientific management of municipal business"), in its weekly leaflet for May 16th, publishes the following, which we commend to the attention of the officials of all cities—also to the civic associations, boards of trade, and all others interested in having citizens interest and inform themselves in city affairs:

Nearly all cities issue some kind of annual municipal directory. These range in size from modest leaflets to lengthy volumes. They vary in contents from mere lists of officials to elaborate descriptions of the local government and its activities.

The most noteworthy of these are the Municipal Year Book of the city of New York, compiled by the municipal reference librarian, the Chicago City Manual, prepared by the city statistician, and the Boston Municipal Register, compiled by the statistics department. Each explains the organization, function, and activities of the city government, and the powers, duties and salaries of the important officials. The unusual accomplishments and notable achievements of each department during the year are also given attention.

Of course, there are variations in the nature of the general information included in the three year books. The New York one includes, besides the really essential information, only a few statistical tables. The Chicago Manual devotes a number of pages to local history and literature and to discussions of hot weather and sacrilegious changing of street names. The Boston Register emphasizes statistics of population, area, elections, and finance.

All of the essential information of these year books has been gleaned from laws, city charters, ordinances, and reports of departments. To locate these facts quickly in the original sources is a difficult task for a specially trained person and an impossible one for the average citizen. If collected and well indexed in a handy reference book, these facts become easily accessible to every one.

A plan could easily be worked out as to what facts are wanted regarding each department, bureau or other unit, or which data are important concerning given phases of municipal activity. Then uniform information, comparable statistics, and a minimum of useless material would be at the quick disposal of every official, every councilman, every citizen.

Some officials seem to take pride in the amount of matter they put into their annual report, while the real test of its value should be the amount that the readers get out of it.

This depends upon the reader as well as upon the matter, and the report should be adapted to the readers—the average citizens. Unless they can use it to keep in touch with the affairs of the city, the report is so much waste paper.

The aim in preparing these reports should be maximum of quality and minimum of quantity. Service in promoting civic interest, and not surface area of printed pages. Thousands of pages of municipal reports are printed every year that no one reads but the proof-reader, and he has to be paid to do it. In the general crusade for economy, why not apply it to the saving of a few tons of paper by cutting all useless matter out of municipal reports?

MUNICIPAL ADVERTISEMENTS.

While on the subject of waste in municipal printed matter we are reminded of another medium of such waste—and again our text is taken from Philadelphia. In a copy of the "Public Ledger" of that city we find one hundred and sixteen consecutive inches—nearly ten feet—of matter like the following:

> Unique Auto Radiator Company, motor parts, etc., two hundred and seventy-eight (278) dollars and thirty-five (35) cents; Manufacturers' Supplies Company, motor supplies, one hundred and seventy-three (173) dollars and ninety-eight (98) cents; F. A. Mitchell, motor supplies, two hundred and eighty-three (283) dollars and seventy-one (71) cents; The Christensen Engineering Co., motor parts, etc., two hundred and fifteen (215) dollars and twenty (20) cents; Sterling Tire Corporation, tires, seventy-five (75) dollars and eighty-eight (88) cents; The Prest-O-Lite Company, prest-o-lites, etc., eighty (80) dollars and

This is part of a published ordinance, all but one inch of which consists of a list of expenditures made by various departments in excess of their appropriations, the ordinance making additional appropriations to pay the bills for these. We presume the law requires publication of all these items, possibly requires that each sum be stated in both figures and words, but if so it certainly defeats its own end (unless this end is keeping the newspaper business managers happy). Only the most persistent investigator would ever read such a mass of matter, and then he would set it down in figures in tabular form so that he could check up totals. If the amounts must all be published, why not publish them in tabular form thus:

Unique Auto Radiator Co.; motor parts.....	$278.35
Manufacturers' Supplies Co.; motor supplies.....	173.98
F. A. Mitchell; motor supplies.....	283.71
Christensen Engineering Co.; motor parts.....	215.20
Sterling Tire Corporation; tires.....	75.88
Prest-O-Lite Co.; prest-o-lites.....	80.15

In this form it would occupy about half the space and the several items could be found and the amounts totaled.

But why print even five feet of such items, approximating a thousand in number? The books of the departments are public and can be inspected by a representative of the taxpayers if there is suspicion of irregularity; and only deep suspicion would cause any one to

wade through yards of such figures, even though thrust before him with his morning news.

We believe in publicity. It has been the most effective agent in raising the world out of the dark ages, and more recently in the development, in less than one generation, of a "Public be Pleased" attitude where formerly a railroad president said (and acted) "The Public be Damned." But words are said to be used by diplomats to conceal the truth rather than to tell it, and publicity may be so used as to produce the same effect, although unintentionally. We have no doubt that every item in the advertisement referred to was correct; but we question whether the readers of the "Public Ledger" even noticed that the statement was made that the several departments mentioned had exceeded their appropriations by $403,971.

Suppose a few inches of a newspaper column had been used to state the fact as follows:

CITY EXPENDITURES IN EXCESS OF APPROPRIATIONS.

City Councils have passed and the mayor has signed an ordinance appropriating $403,971.59 to pay bills incurred by city departments in excess of previous appropriations. The amounts of such excess expenditures by the several departments are as follows:

Department of Public Safety	$8,468.05
Department of Public Works	43,524.78
Department of Public Health and Charities	24,279.34
Department of Supplies	212,791.84
Mayor	1,412.40
County Commissioners	108,314.19
Coroner	237.18
Receiver of Taxes	508.47
City Treasurer	4,335,34
Total	$403,971.59

About 800 items are included in these expenditures. These have been tabulated and the tabulation may be consulted by interested taxpayers at the office of the City Treasurer.

That would perhaps give publicity to the matter. The advertisement referred to was publication but not publicity. Paying for it was a waste of the public money for which there is no excuse except that the law requires it, and for the law itself there is no excuse.

ENGINEERING STUDENTS ALSO SERVE.

A general withholds reserves from a battle until the last extremity, for, if absence of them should cause no other calamity, it may prevent him from reaping the fruit of victory. Irksome as the waiting is to them, the reserves are as necessary and important a part of the army as those in the front ranks. "They also serve who only stand and wait."

Fortunately, the United States has largely avoided England's mistake in using as fighters her engineers and other skilled and learned men who could have served their country much better by performing the work for which they were trained. But we are using them—are sending them "over there" by the thousands; and very many of them will never come back. In England and in France the loss of engineers will have been far greater than in this country before the war is ended.

On the other hand, the demands for engineers after the war will be greater than ever before. They will be needed for rebuilding roads, changing munition factories to serve peaceful purposes, rebuilding Belgium and northern France in almost every detail; while Russia and China will be seeking their aid in securing all the modern improvements of civilization. If the men are not then available for carrying on this work, it will greatly delay the reconstruction and the reaping of the full fruits of victory.

The necessity now is to win the war, but even the importance of this should not prevent us from exercising foresight and preparedness for peace. Engineers must be had. Where will they come from? Must we delay development while we are educating them, or will we have them in reserve like a wise general? There can be no question as to the proper course. Technical schools, instead of reducing their teaching capacities, should double them, and there should be a supply of students that would use to the utmost these increased facilities. A young man with a talent for engineering could serve his country better by acquiring a technical education than by fighting. When that education has been acquired, if the war still continues, he will be far better prepared to aid his country in the prosecution of it, while others take his place at the schools. If the war shall have ended, he still can aid his country in recovering from its wounds and ravages, and this service will be no less important than the other.

Engineering schools should not be made asylums for slackers—good engineers are not slackers, and slackers will not make good engineers. But the draft boards should permit earnest students to complete their courses (they constitute but a fraction of one per cent of the total draft). And let us persuade young men who have engineering talents to resist the patriotic impulse that calls them to the battlefield and start at home preparing for a more important service, or finish such preparation if they have begun it. Let us put it to them as a matter of patriotism that they should assist in maintaining a reserve of able engineers, and that by enlisting for such reserve, if they do it in a spirit of patriotism, not less than those who enlist for duty in France do they also serve.

THE A. W. W. A. CONVENTION

Continuation of Description of Thirty-eighth Annual Convention—Discussions on Superintendents' Day—Experiences with Frozen Services.

Reported by CHARLES CARROLL BROWN.

The peculiar conditions accompanying the treatment of water at Council Grove, Kan., described in the paper by L. L. Tribus, were shown to be common to the cities and towns on the Neosho river, in the discussion by C. C. Young, director of the Laboratory of the Kansas State Board of Health. Colloidal clay in suspension in the river water at certain stages of floods carries aluminum sulphate and the addition of more seems to have little or no effect in coagulation, whereas under more usual stages of river flow the chemical has its usual effect. Another difficulty is that the sand in the filters sometimes turns black, and the usual washing will not whiten it. The efficiency of filtration seems not to be interfered with. The discoloration seems to be due to deposit of manganese and iron from the water on the sand and the growth of certain algae. Some natural sands from the same vicinity show the same discoloration. The small plants run about 6 hours and rest 18 hours, without washing, and the stagnation increases the discoloration. The only effect of the discoloration is to show to the eye that the filter is not properly operated. The eight plants along the river have several methods of washing, several varieties of filters and methods of correct operation.

The paper on the "Practicability of Adopting Standards of Quality for Water Supplies," read by Abel Wol-

man Wednesday evening, was rather negative in its attitude. The U. S. Treasury standard was taken as the text and its inefficiencies and inaccuracies were shown in considerable detail. However, the reasons for many of them were as clearly shown and the argument appeared to be that if standard methods of analysis and of mathematical interpretation were adopted there would be more chance for the fixing of standards of quality. Since the Treasury standard does not fix methods of analysis and interpretation definitely, it lies open to all the large variations due to the differences in methods, and so waters reported on by one analyst may be accepted whereas much better water examined by the methods of another may be rejected. To one who aided in the first applications of bacteriological analysis to the waters of streams, the arguments and statements regarding necessity of standards of manipulation and analysis were very familiar, although first made nearly thirty years ago when knowledge of the subject was far less extensive, though apparently not much less definite so far as it went. The discussion further emphasized the differences in systems, in water to be treated, in methods of operation, in methods of analysis and in methods of interpreting results, as well as in the purity required and the necessity of co-operation and of co-ordination of work in all these lines as well as differentiation of standards to meet the variations in requirements.

Thursday was superintendents day and the "school" was left to carry on its debating society without the aid of the instructors. The principal subjects were the severe weather of 1917-8 and its effect on service pipes, mains, hydrants and consumption in the forenoon and office records in the afternoon. No papers were scheduled on the program but a number of short papers were read, from which the following data were gleaned without close attention to who made the report.

A. W. Cuddeback, engineer and superintendent of the Passaic Water Co., Paterson, N. J.; W. H. Randall, superintendent of water maintenance, Toronto, Ont.; R. C. Wheeler, Philadelphia, Pa.; W. E. Miller, Madison, Wis.; D. R. Gwinn, Terre Haute, Ind.; H. Hymmen, Kitchener, Ont.; A. Bugbee, Trenton, N. J.; Wm. Luscombe, Heat, Light & Water Co., Gary, Ind.; Chas. A. Windholz, Syracuse, N. Y.; C. E. Bolling, Richmond, Va.; J. M. Diven, Troy, N. Y.; W. A. Judd, Mason City, Iowa; R. F. Johnson, Saginaw, Mich.; L. B. Landmann, Jefferson City, Mo.; F. E. Kingsbury, St. Louis, Mo.; W. H. Henby, St. Louis County, Mo.; J. A. Jensen, Minneapolis, Minn.; H. P. Bohmann, Milwaukee, Wis., contributed to the supply of data.

As to increased consumption on account of the cold weather last winter, most of the plants reported February as the month of maximum consumption instead of the usual August. The only exceptions were Montclair and another city, which are wholly metered, and in these cases the consumption in February was enough larger than usual to approach closely the August maximum.

In Paterson a comparison for several years showed a point of maximum in February except this year when December, 1917 and February, 1918 were the same as February, 1917, and January, 1918 was appreciably higher. This maximum exceeds the previous maximum daily average consumption for the month by 61 per cent. The system is 65 per cent metered, including all manufacturing plants, saloons, dwellings with more than two families and all new services put in since 1900. A comparison of the curves showing average daily consumption for the month and average temperature for the month shows that the former follows the latter very generally, though not always parallel, and about 24 hours later. The filter capacity being about 80 per cent of the maximum draft required, some sterilized river water was admitted. Part of the district supplied by the plant had outbreaks of intestinal troubles and part had none, while other neighboring districts and others in New Jersey not supplied had the troubles, so that it was decided that the water supply was not responsible. The maximum draft for any day was on January 3, 1918. The capacity of the plant is being increased 30 per cent to meet the next similar call.

In St. Louis in 1917 the average daily consumption of water was 92,000,000 gal. with 570 miles of streets sprinkled five or six times a day, street flushing at night and lawn sprinkling. The maximum of 133,900,000 gal. was reached June 26. On January 12, 1918, the coldest day, 17 deg. below zero, the consumption was 156,500,000, about 70 per cent in excess of the yearly average for 1917. The average consumption for the 6 weeks, Dec. 28 to Feb. 8, was 126,400,000 gal. per day; nearly equal for each of the 43 days to the previous single day maximum of June 26, 1917. The excess for this 43 days over the normal average, at $40 a million gallons, is worth $60,000, requiring 65 tons of coal a day more than the usual average. This great waste was admittedly due to letting water run to prevent freezing, though every house is required to have a cut-off and drain inside the house so that the water can be turned off for the night or when the house is not occupied or otherwise liable to freeze.

In St. Louis County, Mo., 15 per cent more water was pumped during the 90 days after Dec. 15 on account of letting water run to save meters freezing. The maximum was 35 per cent above normal. If water used by manufacturers is omitted, the excess was 50 per cent.

FROZEN SERVICES.

The data regarding freezing of services and mains and methods and cost of thawing were quite extensive. In Paterson 1,000 service pipes and 50 or 60 hydrants and hydrant branches froze, but no mains. At first they were thawed by using hot water or steam, but the calls were too numerous and a truck was equipped with a gasoline engine and electric generator with capacity of 300 amperes at 20 to 30 volts. This was worked with six men and a Ford runabout attendant in two 8-hour shifts, 8 to 12 services being handled by each shift. The work was helped out by a private storage battery outfit on a Ford truck. A ¾-in. service pipe required 30 to 40 minutes and an encrusted pipe 30 to 90 minutes after connections were made. Pipes without the lead pipe goose-neck thawed more easily than those with one. The generator outfit was faster than the storage battery. There is great danger of freezing immediately after a pipe has been thawed. Water should be let run slightly until danger is past.

Toronto found that stop-cocks were useless after freezing, and services below frost line must be dug up and reconstructed. About 500 services froze, but no mains.

Auburn, N. Y., had no difficulty where inverted type of cocks was used.

In Peterboro, Ont., 200 services were frozen and required 5 to 10 min. time to thaw by electricity after connections were made.

Trenton, N. J., had 2,000 services frozen and used the electric process, with a 500 amp. generator at 10 volts geared to the truck axle. Services are 4 ft .deep and all trouble was in sand and gravel, none in clay soil.

Little Rock had seven 6-in. services to automatic sprinkler systems frozen, and possibly others were not discovered because no water was drawn through them.

Gary, Ind., with 70 miles of mains and 600 services and 4.5 ft. of frost, had no freezing.

(To be concluded.)

The WEEK'S NEWS

Status of Indiana State Highway Department—Work Planned on Lincoln Highway—Constructing Sewers by Day Labor in Spokane—Water Ownership Tangle in New York City—Federal Loan to Power Company—Merge Niagara Falls Power Plants—Vice Elimination in Cincinnati—Federal Board Approves Milwaukee Improvements —Garbage Disposal in Washington—Proposed Zone Plan for Illinois Cities—Housing Plans of U. S. Shipping Board.

ROADS AND PAVEMENTS

Stop Highway Work After Court Decision.

Indianapolis, Ind.—Following the decision of Judge Cloe, of the Hamilton county circuit court, at Nobbsville, that the law creating the state highway department is unconstitutional, engineering work has been stopped in the department. The case is to go before the state supreme court and a final verdict will probably not be reached until fall. The whole status of the work of the department being in question, the officials have decided to stop planning work. Almost the whole engineering staff, numbering about forty engineers and draftsmen, has been discharged.

Estimates of Work on Lincoln Highway.

Detroit, Mich.—H. C. Ostermann, field secretary of the Lincoln Highway Association, has announced that in spite of labor shortage, high cost of material and other retarding influences, more work is to be completed upon the Lincoln Highway in 1918 than ever before. Estimates indicate that between five and six million dollars will be spent in improvements upon the route from the Pennsylvania-Ohio line to the Pacific Coast. Roughly these expenditures are to be divided among the states as follows:

Ohio	$1,420,000
Indiana	425,000
Illinois	1,745,000
Iowa	500,000
Nebraska	105,000
Utah	290,000
Nevada	158,000
California	140,000

Permanent all-weather construction will absorb $3,920,000 of this amount, the sections of road so constructed will be mainly brick and concrete, with a small percentage of macadam. Graveling, grading and bridge work will take $858,000, while maintenance of the dirt sections of the Lincoln Highway, such as grading, draining and dragging, in the mid-western states of Iowa, Nebraska, Wyoming and Nevada, will cost $500,000 in addition at a conservative estimate.

Try to End County Road Bond Litigation.

St. Louis, Mo.—Prosecuting attorney Ralph of St. Louis county has filed in the United States Supreme Court a motion to dismiss the appeal of Thomas K. Skinker and L. Cass Miller in the St. Louis County road improvement case and end the litigation which has for three years prevented the expenditure of the $3,000,000 bond issue voted by the people of the county. If the motion is successful the county officials will try to sell the bonds. There is doubt, however, whether they can be sold now. In 1915 they were in demand and could have been sold at a premium. It is probable that, even if they can be sold, there will be a loss of many thousands of dollars in premiums. In addition, the $3,000,000, on account of the increased cost of material, will hardly build more than one-half of the mileage contemplated in 1915. The appeal will be attacked on the ground that it is frivolous and it will be pointed out that prior to the institution of the suit and while the appeal has been pending there have been decisions of the Missouri Supreme Court adverse to claims made by the appellants. Skinker's main contention was that the bond issue was void because none of the proceeds from road bonds could be used in the improvement of those parts of a public road lying within the limits of an incorporated town. The Missouri Supreme Court in two decisions has held that the term road applies to city streets as well as rural roads. Skinker, following the decision of the state supreme court in the St. Louis county case, raised the identical question in the United States district court, and on an adverse decision carried the case to the United States Supreme Court. In the motion attention is called to the fact that the United States Supreme Court, in a long line of decisions, has adopted the construction of a state statute placed upon it by the supreme court of the state. The motion urges that a public enterprise like the improvement of public roads should not be further delayed by an appeal declared to be so frivolous as to suggest an abuse of the right of appeal. A plan devised by bond experts for avoiding delay by issuing refunding bonds was frustrated by the refusal of the St. Louis county court to authorize the issuance of the refunding bonds. Jefferson county and Wayne county, however, confronted by the same situation, have issued refunding bonds and proceeded with the work of road construction, and the supreme court has decided that the refunding bond plan is legal.

SEWERAGE AND SANITATION

Declares Town Insanitary; Forbids Soldiers' Visits.

Wrightstown, N. J.—Continued failure of the authorities and citizens of Wrightstown to make the town sanitary has resulted in Major Gen. Scott issuing an order forbidding officers and enlisted men to enter the town. The town has been frequented daily by thousands of soldiers and visitors, and the new stores and other business establishments which have sprung up to cater to these crowds represent investments of more than $500,000. Major Gen. Scott explained that the order had been issued only after repeated failures of sanitary officers to get Wrightstown citizens to improve the town. The need for improvements, he said, had been called to their attention in February. The ban would be lifted, he added, only when the demands of the sanitary corps are met.

City's Day Labor Does Well on Sewer Construction.

Spokane, Wash.—City engineer Butler, foreman Yake and commissioner of public works Funk, have reported that all five of the new sewers in the Fourth Ward sewer District No. 5 have been completed by the department under the day labor plan at a cost of only $34.89 over the city engineer's total estimate. These five sewers, built by the public works department at an aggregate cost of $16,453.58, were ordered constructed under the day labor plan last October after calls for bids brought a response from only one contracting firm, which bid on only two of the sewers. In doing the work for itself the city was able to take care of the winter unemployment problem without difficulty, a hundred and twenty men having been given work right through the winter and the city paying them wages amounting to $11,123.33, which city engineer Butler reminded the council was just about the amount which the city council appropriated in 1915 to care for the unemployed. Two of the jobs, done in good weather, were completed far below the engineer's estimate in spite of the fact that the city, with its war bonus system, paid its common laborers $3.50 a day compared with the $3 wage

scale prescribed by ordinance, which a private contractor would have been permitted to use. This difference alone made the jobs cost the city $1,250 more for its common laborers than a contractor would have been compelled to pay with a similar number of men employed. Heikkila, Miller & Paulson was the one contracting firm which submitted bids on sewers in this group last fall. It bid on what are known as sewer No. 2 and sewer No. 5. Sewer No. 2 was built by day labor for $3,663.56. This was $87.82 above the estimate and $97.82 above the contractor's bid. The cost of sewer No. 5 was $2,241.38, which was $123.20 under the engineer's estimate and $71.20 under the bid made by the contractors. Sewer No. 4 cost, by day labor, $3,939.25, which was $143.52 under the estimate. The cost of sewers Nos. 1 and 3 both went over the city engineer's estimate. Sewer No. 1 cost $1,872.95, or $39.56 above the estimate; while sewer No. 3 cost $4,736.44, or $174.23 above the engineer's estimate. During the process of the work connections with the sewer were made for twenty-six homes at actual cost, plus 10 per cent. City engineer Butler, in his report, in part says: "Credit is also due to the foreman and workmen on the job for the splendid manner in which they carried on the work. While union and non-union men and men of many different nationalities were employed there was no friction or labor trouble of any kind. They all took great interest in making as good a showing as they could, which alone made it possible for the work to be done in such a business-like manner with such good results."

Anti-Malaria Work in War Industries Center.

Philadelphia, Pa.—As a result of recent engineering and public health conferences conducted jointly by the state department of health of Pennsylvania, the city department of health, the department of public works, United States Naval authorities, the Emergency Fleet Corporation and the Westinghouse Corporation, engineering plans have been completed for draining all marsh land and eliminating all mosquito breeding places by ditching and pumping and treating with oil and larvicide that section of Delaware and Philadelphia counties adjacent to the great war industries on the Delaware and Schuylkill rivers. Governor Brumbaugh and other members of the special Commission on Public Safety and Defense, gave to the state department of health $75,000 of the special $2,000,000 war fund appropriated by the last legislature. Lieutenant governor McClain and adjutant general Beary will keep in immediate touch with the health department in the expenditure of this fund. The action on the part of the Commission on Defense was taken to keep the night shifts of labor in these great war industries and at the same time protect the hundred thousand laborers from malarial infection. The cost of the work will approximate $215,000 and will be shared by all agencies joining in the conference.

WATER SUPPLY

City and Company Send Bills for Same Water.

New York, N. Y.—A dilemma is confronting the 3,000 and more householders in the McKinley Park and adjacent sections of Brooklyn. They have received bills for the same water from the water company and from the city and each demands payment and makes threats. These homes are being supplied with city water through the mains of the Blythebourne Water Company. Most of them, according to the city officials, are answering by paying the city's water bills. A good number, according to the Blythebourne concern, are paying the company's bills. The city officials assert it is a serious situation. The Department of Water Supply, Gas and Electricity has notified the persons affected that if they do not pay the bills presented by the city the supply of water for their homes will be shut off. On the other hand, the company sent out an official notice to all its customers, advising them the city has no right to demand or enforce payment and will not attempt to cut off water for which the company has been paid, and furthermore asserting: "This company alone has the right to receive payment for water supplied through its mains." It is not improbable, according to deputy commissioner C. M. Sheehan of the department of water supply in Brooklyn, that householders having Blythebourne mains will have the water shut off if they fail to pay the city's bills. He said, however, that the city may let the matter stand, but will charge up its water bills as a lien against the property concerned. "The city, under the law, has a lien against property where water bills are not paid," said Mr. Sheehan. "It means to enforce that lien in this instance. We have stood enough nonsense from the company. It is seeking to collect payment for water which it has not furnished and which it could not possibly furnish. We do not intend that the city is to go unpaid. The Blythebourne company has previously had city water in its mains and the city has never received a cent for it. The city got judgment against the company for $25,068.40 in the Supreme Court nearly two years ago. It hasn't yet collected on the judgment." The bills about which the present controversy centers were submitted by the city as of May 1. The bills are for water for the eight months from that date. The company's bills were similarly presented, but covered the year beginning May 1. The city of New York has been supplying water through the mains of the Blythebourne concern since last November. The then general manager of the company, Henry A. Frey, notified the city that it would be forced to suspend on November 22, because of the high price of coal and other difficulties. The Blythebourne Company formerly had a general office which is now closed, and even the telephone has been discontinued. An inspector of the company said: "There is no reason why customers should not pay our bills. They are using city water, it is true, but our pipes supply the water, and every drop of water that comes into our mains from the city is carefully metered. The arrangement is that we pay the city for the water."

Increase Water Rates for Large Consumers.

Watertown, N. Y.—A new schedule of water rates is soon to be made effective in this city. The water, light and power board special committee on rates has reported and was voted authority to carry out the schedule suggested and to seek its approval by the common council. The new schedule does not increase the cost of water to the domestic consumer or the small users, but those who use large amounts and who have been paying a very low rate will be called upon to pay more for every gallon used. The increase applies to those using in excess of 61,000 gallons. The lowest rate on the new schedule will be three cents per 100 feet—raised from 2¼ cents. This will apply to those using to exceed 110,100 feet. The next lower class formerly paying three cents, will pay 3½ cents. The board has found that with the cost of labor and filtering materials almost doubled, and figuring on an investment of $800,000, it costs three cents per 100 feet to furnish filtered water. This new rate will be temporary, for it was said by commissioner H. E. Harmon of the committee that it may be found necessary to make another advance in about twelve months.

Water Supply Improvements in Pennsylvania.

Harrisburg, Pa.—During the month of April the state health department issued decrees and permits regarding water works improvements as follows: Ambler (Ambler Spring Water Co.), approving existing water works and requiring plans for germicidal apparatus; Coatesville, approving the use of additional filter units in connection with the public water supply; Rimersburg, approving a drilled well as an additional source of water supply for the municipal water works; Birdsboro (Birdsboro Water Co.), approving plans for improvements comprising changes at Indian Run reservoir, additional pumping unit, sedimentation basins and germicide apparatus; Patton (Patton Water Co.), approving plans for improvements to the water works comprising installation of new pumping units, coagulant and chemical apparatus and baffles in reservoir; Sewickley, approving plans for germicide apparatus for installation in connection with the municipal water supply; Shickshinny (Shickshinny Water Co.), decree requiring immediate improvements to the water works including plans for filtra-

tion plant; Springfield Cons. W. Co., decree requiring submission of plans for extension of the several filtration plants; West Chester, decree requiring improvement of the public water supply including plans for filtration plant.

STREET LIGHTING AND POWER

First Government Loan to Power Company.

Washington, D. C.—Directors of the War Finance Corporation have approved the first loan to be made under the authority conferred upon them by the act approved April 5, 1918. The loan, which was authorized after a hearing of representatives of those interested, is for $1,000,000, and will run for two years. It will be made under section 7 of the act through two large banking institutions on the Pacific Coast to the Northwestern Electric Company. The loan will be made on the notes of the bank secured by first mortgage bonds of the company, supported by other collateral in accordance with the requirements of the act. The additional power to be generated through the extensions and enlarged operations of the electric company will be used in connection with shipbuilding. This loan being made through banks, the rate was fixed at 6 per cent. per annum.

Rates Raised While Case Is Pending.

Fremont, Neb.—Announcement of a raise of 25 cents 1,000 feet in the price of gas has been made by the Fremont Gas, Electric Light & Power company here. Six weeks before the company asked permission of the city council to make the increase. The council has had the matter under consideration, but no definite action has been taken. A committee was appointed to investigate records of the gas company. About a year ago the council passed an ordinance providing for a cut of 15 cents 1,000 feet or from $1.50 to $1.35. The gas company went to the courts and the case is now pending in the United States court at Omaha. The new rate will be $2 per 1,000 feet with a rebate of 25 cents if the bill is paid by the tenth of the month.

Water Power Companies Merged Against City's Opposition.

Niagara Falls, N. Y.—The Thompson bills, authorizing the consolidation of the Cliff Electrical Distributing Company, the Niagara Falls Power Company and the Hydraulic Power Company of Niagara Falls, approval of which was advocated by Secretary of War Baker, were recently signed by governor Whitman. The object of the enabling acts is to permit the proposed new consolidated company to use the Niagara water power more efficiently. Representatives of the cities of Buffalo and Tonawanda, the Buffalo Chamber of Commerce and of power and irrigation companies operating along the Niagara river appeared before governor Whitman to oppose the bills. Mayor Buck and corporation counsel Rann of Buffalo said they were instructed by unanimous vote of the Buffalo city council to oppose the legislation. Mayor Buck declared that the legislation was not necessary, and advised that "under a plea of emergency something should not be done that would result in lasting damage to our city." Governor Whitman read two letters he had received from war department officials regarding the enactment of the measures as necessary war legislation for increasing the output of munitions plants at Niagara Falls. The power increase is said to be 170,000 horsepower. The mayor of Niagara Falls and federal power administrator Bulkley spoke for the bills. Buffalo objected for the following reasons:

"1. That the consolidation desired can be effected quickly with the approval of the public service commission of the second district without this legislation.

"2. Even if that were not so, we know of no reason why the federal government could not exert its power to commandeer, take over these properties pending the war, and see to their proper and efficient administration.

"It seems to us that the representatives of the war department are laboring under a misapprehension in urging the approval of these bills which we feel would work serious hardship to the city of Buffalo and its people for an indefinite period after the present war shall have been ended. The first sentence expressly authorizes the consolidation of these companies 'notwithstanding the requirements of any other law into a single new corporation, in the matter and 'with the effect specified, in respect of consolidations, in the business corporations law.' A subsequent clause authorizes the consolidated company to issue shares, the par value of which shall not exceed but may equal the aggregate of the outstanding capital stock and the surplus, unimpaired reserves and undivided profits of said corporations so consolidated 'as shown by their report and books.'

"It seems to us that the subsequent provisions of this bill, requiring the approval of the public service commission of the second district and placing the consolidated company under the supervision and control of that commission, so far as the public services to be performed and rendered by the consolidated corporation are concerned, have the effect of limiting the jurisdiction of that commission rather than extending it or preserving it unimpaired, and we are extremely apprehensive that the state will lose by the approval of these bills the power to regulate the capitalization of the proposed consolidated company and the rates to be charged by it."

Work was started immediately on the improvements. The hydraulic company's forebay will be considerably enlarged. The new tunnel will extend from well out in the river to the forebay, discharging the water there. The tunnel will be built in the rock under the Hydraulic canal. The tunnel will operate on the syphon principle. The entire face of the country along the north side of the canal basin will be changed by the enlargement of the forebay. A number of old buildings in that vicinity will be replaced by modern structures. The amalgamated companies will have a new office building. Representatives of the companies agreed to a stipulation proposed by representatives of Buffalo that power in excess of the amount commandeered by the government for the period of the war and power generated after the war should be controlled in distribution by the public service commission.

Council Allows Rate Increase.

Hancock, Mich.—The city council has passed an ordinance granting the Michigan Gas & Electric company permission to charge users of gas $1.40 per thousand net, or an increase of twenty cents. The question has been up before the Houghton and Hancock councils for some time, and considerable opposition was shown. It is expected that the Houghton council will grant the company an increase in rates in Houghton also.

FIRE AND POLICE

Voters Approve Increased Pay for Firemen and Police.

San Jose, Cal.—By a vote of 4079 to 1846 the voters have approved the plea of the firemen to have their pay increased from $80 to $100. A newspaper advertisement used in their campaign was reproduced in a recent issue in these pages. At the same referendum the police won an increase in salary by a vote of 3521 to 2201. A proposal to increase the tax rate was defeated by 3871 to 1880.

Training Station at City University Bars Vice.

Cincinnati, O.—As a result of the recent establishment of the new military training station at the university the city of Cincinnati throughout its entire area is now definitely subject to the rule and regulation that no house of ill-fame is allowed to exist anywhere within the municipal bounds. The whole "restricted district" must go. The penalty for violation is a fine of not more than $1,000 or imprisonment for not more than two years, or both fine and imprisonment. Authority for the action proposed is found in section 13 of the Selective Service Regulations defining the conditions that must prevail in and around military camps and training stations and the powers conferred on military and other officials for making the regulations effective. The area barred against disreputable houses is specifically any and all places within the five-mile distance in the case of a training station. From the location of Ft. Thomas, the university station and every spot within the city's corporate limits, it is stated, will be found to lie within the barred area. Prohibition advocates made a first move in an effort to have government authorities declare the station a "military camp," which would be ground for closing up all liquor dispensaries in

the district within a half mile. Some of the movers thought this rule also would catch breweries located in the same area and were urgent for action on that account. It was found, however, that the government's military regulations distinguish between "camps" and "training stations." Under the interpretation given, Camp Sherman and the Dayton aviation grounds are designated as the only "camps" in Ohio, and it was on that account that the dry workers failed in efforts to have the university station classed as a camp. In determining to enforce the entire elimination of restricted districts from the city federal officials here acted on their own initiative. Not only do the penalties apply to the persons who personally maintain disreputable houses and are responsible for their operation, but also apply to all others who, as patrons or solicitors, are found guilty of contributing to the maintenance of these offending resorts within the five-mile barred area. Proceedings under the rule are conducted by the agents of the Department of Justice, backed up by the deputy marshals and directed by those officials who are charged specially with carrying out the military regulations.

Town Almost Destroyed by Fire.

Fulton, S. D.—The town of Fulton, seven miles southwest of Alexandria, was practically wiped out of existence by fire. The total loss will be $109,000 to $250,000. The fire started soon after 3 o'clock, and because of a high wind that was blowing at the time and because there was not sufficient water available and no modern fire fighting equipment, practically burned itself out by 6 o'clock. Assistance of nearby towns was called, and automobiles carrying 200 men and equipment from Alexandria went to the scene, but could do little to prevent the speed of the flames. Farmers from a wide territory came in and rendered what assistance was possible. The fire originated in the roof of the depot, a spark from a passing freight engine being blamed. The depot was located at the south end of the business street. From it the flames, driven by a high south wind, quickly spread to the business section of the town, which, with but one or two exceptions, was wiped out along with a number of dwellings. No one was injured.

Fireman Killed in Big Shipyards Blaze.

Vancouver, B. C.—The building of steel ships in Vancouver received a severe set-back as a result of a fire which destroyed a large portion of the plant of J. Coughlan & Sons on False Creek. Robert Cameron, a fireman from No. 12 Hall, was killed by a falling wall. Damage was done to an estimated extent of between $1,500,000 and $1,750,000, and more than half of the company's 2,800 employees were out of work. Reconstruction of the plant will need months of time. The works had four ship ways, two of which, with keels laid, are entirely intact. No. 3 way, with the "War Charger" under construction, was partially destroyed, and the "War Charger" was subjected to tremendous heat, which warped some of her plates and caused other damage; but the damage to this ship is not beyond repair. On the next way was the "War Chariot," 75 per cent. plated, which is a total loss. The supporting piles burned through, the foundations gave way and the ship settled down in the mud with her back broken. Salvage operations would be very expensive. The fire started in the boiler room, and gained great headway when the acetylene plant used for welding exploded. The entire fire fighting equipment of the city turned out, but the men were handicapped greatly by the lack of a fire boat. The blaze was very spectacular, and although it started about 2:30 a. m. there was soon a great crowd of spectators. As the fire spread and there was danger of the two ships falling victims where they were moored for being fitted out volunteers took them in tow with tugs and motor boats and hauled them into the stream to safety. Fireman Cameron was killed by a falling wall of the boiler shop. He was with several other firemen when the walls started to sway. Other firemen received minor injuries. By 4:30 a. m. the fire was under control.

GOVERNMENT AND FINANCE

No Bidders for Bond Issue.

Buffalo, N. Y.—No bidders appeared at the recent scheduled sale of $1,470,000 worth of city bonds at 4½ per cent. interest. The charter provides that the bonds may be sold at private sale at not less than par and accrued interest. Councilman Heald, of the department of finances and accounts, will endeavor to interest local banks in the issue. This is the third time this year that no bids have been received for city bonds. The bonds offered for sale included: For Hamburg turnpike improvements, $45,000; $230,000, grade crossing repairs; $100,000, Bird Island pier improvement work; $50,000, turning basin bonds; $150,000, Buffalo river improvement bonds; $200,000, trunk sewer bonds; $380,000, school bonds; $30,000 park bonds; $60,000, underground police and fire-alarm bonds, and $225,000 in water bonds.

Councilmen Sentenced for Bribery.

Youngstown, O.—William F. Davis and William F. Mehlo, members of the Youngstown city council, recently convicted in the Mahoning county common pleas court of accepting a bribe for their support of a proposed municipal ordinance, have been given indeterminate sentences of from one to ten years in the state penitentiary and ordered removed from office. The sentenced men were denied new trials by the court. Both gave notice of appeal to the court of appeals and will be granted their liberty until decision is handed down. Five councilmen—Hugh Best, David Shermer, Harry Hogue, D. J. Morgan and F. P. Galvin—indicted, like Mehlo and Davis, on charges of soliciting and accepting bribes, are yet to be tried.

Capital Issues Committee Allows Improvements.

Milwaukee, Wis.—City comptroller Louis M. Kotecki has received work from the capital issues committee of the federal reserve board at Washington permitting the issuance and sale of bonds by the city for certain purposes. The amount of the issues which are endorsed is $1,050,000, while action was deferred upon issues amounting to $1,420,000 by the board. The requests which have been so far favorably passed upon by the board, with the amount of the reductions ordered in the individual issues by the board, are as follows:

	Amount Allowed.	Amount Requested.
Sewer	$200,000	$350,000
Harbor improvements	150,000	350,000
Sixteenth street viaduct	200,000	200,000
Lake Shore drive	200,000	300,000
Park improvements	50,000	150,000
Hospitals	50,000	50,000
Schools	200,000	500,000
Total	$1,050,000	$1,900,000

These bonds are all which have so far been allowed by the board on requests for the issuance of bonds amounting originally to $5,700,000, although there was a decided reduction in these requests at the hearing on the question. The requests still pending are as follows: State street bridge, $150,000; North avenue viaduct, $200,000; municipal lighting, $500,000; Central police station, $250,000; bath houses, $70,000. Total, $1,170,000. Of the bond issues allowed the $200,000 issue of sewer bonds is to take care of the extension of sanitary sewers into districts of the city that are without facilities at the present time. The $150,000 permanent harbor improvement bonds will complete the rubble mound north of the harbor to Wisconsin street and also care for the urgent repairs of docks at street ends and other inner harbor work that is imperative. The $200,000 Sixteenth street viaduct bonds are for the replacing of the section of the viaduct, which is so seriously injured by gases from locomotives that the commissioner of public works recently had to stop the passage of interurban cars over this viaduct. The $200,000 Lake Shore drive bonds are estimated to be sufficient to care for the urgent need on the south shore at the end of Oklahoma avenue, where the land is rapidly washing into the lake. The other $100,-

000, not being so urgent, was disallowed. The $50,000 park improvement bonds will care for the construction of the building to contain toilets for Washington park zoo and the shelter house in Lincoln park.

STREET CLEANING AND REFUSE DISPOSAL

City to Operate Garbage Disposal Plants.

New York, N. Y.—The city has made arrangements to operate until June 15 and possibly until July 1 the three garbage disposal plants of the Dailey & Ivins Company. The firm went into the hands of receivers on March 2, and it was found impossible to carry on the contract with the city. Mayor Hylan, corporation counsel Burr, street cleaning commissioner MacStay and controller Craig discussed the matter, and judge Hand of the federal district court sanctioned the agreement. The company has three plants, and the city is to pay $400 a day for their use. Mr. Burr said that efforts would be made to have the city build its own plants and operate them. He said that he believed that the municipal authorities were in favor of doing this.

Congress Provides for Capital's Garbage Disposal.

Washington, D. C.—President Wilson recently signed an act passed by Congress giving the district commissioners power to dispose of the city's garbage by reduction or feeding to pigs, poultry or live stock. The commissioners are empowered to take over, by lease or purchase, the plant and equipment operated by the Washington Fertilizer Company for collecting, removing and reducing the garbage and the equipment of M. R. Ready, the contractor collecting and disposing of the refuse. If no agreement can be reached as to prices, the commission is given power to acquire the plants immediately. The price is to be decided upon later by a committee of appraisers appointed by the Attorney-General, the right of appeal to the district court and up to the United States Supreme Court being provided. The commissioners are permitted to feed the garbage to "pigs, livestock or poultry" on district institution land or on land bought or leased for the purpose; or the garbage may be temporarily disposed of by burial. The purchase of collection equipment, either horsedrawn or motor, is also authorized. A total of $620,000 may be spent to carry out the provisions of the act, under the following limitations: Purchase of garbage plant, not more than $85,000; refuse plant, $50,000; pigs, livestock and poultry, $200,000.

MISCELLANEOUS

Preparing New Zoning Plan.

Springfield, Ill.—Following the failure at the last moment of legislation providing for "zoning," Senator Edward J. Glackin is preparing a new bill, to be introduced in the Illinois legislature of 1919, for the "zoning" of Illinois cities. He has conferred with the City Planning Committee of the City Club of Chicago. The new proposal differs radically in two particulars from zoning legislation heretofore proposed or adopted in American cities. The New York plan now in operation and the plan embodied in the Chicago bill defeated at the last session of the Illinois legislature, are based on the police power of the community to protect, promote the health, comfort, safety, and welfare of the people. The community in securing such conditions is under no obligation to pay compensation to any vested interest which might be adversely affected. The theory underlying Senator Glackin's proposal is that the creation of such a building zone or district would be a local public improvement, similar, for instance, to a street-paving or street-widening operation. Property prevented by the districting regulations from attaining its most profitable use would be compensated by damages, while property benefited by the restrictions would be assessed. The city would perhaps contribute from general taxes in cases where the improvement is of more than local importance. Senator Glackin provides in his plan for hearings of all parties interested before the board of local improvements, for the veto of a districting plan or of a change from a plan already adopted by a petition of 40 per cent of the property frontage, for the approval of districting ordinances by the city council and for opportunity for property owners to file objections to the assessment roll in the courts. There is another fundamental difference between Senator Glackin's plan and that, for instance, which New York has adopted. The New York districting regulations are conceived fundamentally as a city planning enterprise. The major part of the city is districted according to a zoning plan, the relations of one district to another being carefully worked out in advance. The Glackin plan leaves the initiative largely in the hands of local property owners and an adverse petition by 40 per cent of the frontage owners in any community would effectually prevent the formation of a "district." Senator Glackin's plan is a departure from accepted theories of "zoning," and a number of questions have been brought up by Chicago City Club members. What would be the practical effect of its adoption? The property owners would be more amply protected. Would he be too well protected? Would a minority of local property interests, armed with a veto power upon any proposal for the formation of a district, be able to check regulations needed for the benefit of adjoining districts or of the city as a whole? Would this veto stand in the way of a comprehensive zoning plan for the city and bring about only a "spotty" regulation? Would the penalty of having to pay an assessment to keep his neighbor from erecting an objectionable structure deter many property owners—particularly those of small means—from agreeing to a desirable districting plan? The Glackin plan, as at present worked out, provides no procedure by which the boundary lines of a proposed district would be determined. And yet the character of the regulations—in fact, the question of whether or not a protesting minority might block the plan entirely—would depend upon the boundary lines arbitrarily drawn by the Board of Local Improvements or by local petitioners. Senator Glackin asserts that in his opinion the plan proposed at the last session can not be passed, that the more conservative proposal which he outlined would stand a better chance of adoption.

Army Engineering and Construction Expenditures.

Washington, D. C.—The Appropriations Committee of Congress has been in conference with experts of the War Department to consider the estimates for the coming fiscal year. The total estimates call for $11,771,666,847. Some of the principal items in the estimates for engineering construction and equipment are as follows: Water and sewers at military posts, $70,569,605; barracks and quarters, $187,190,800; roads, walks, wharves and drainage, $35,117,175; construction and repair of hospitals, $83,653,612; engineer equipment of troops, $135,000,000; engineer operations in the field, $892,000,000; armored motor cars, $347,972,500.

Shipping Board Starts on Housing Projects.

Washington, D. C.—The United States Shipping Board has announced that seven large projects for housing shipyard labor have been decided upon. These will be at Hog Island, Newport News, Camden, N. J., Chester, Pa., Bristol, Pa., Sparrows Point, Baltimore, and Wilmington, N. C., and altogether they will cost about $10,000,000. Perhaps the most extensive will be near Camden, N. J., where contracts have already been let for 907 houses, mostly of brick, at an average of $2,070 each. Between $2,000,000 and $2,500,000 will be expended on this project, which is located in Haddon township. The city of Camden, with which the new town will be incorporated, has undertaken to construct schools, fire stations, sewerage and water works; estimated cost, $325,000. About the same amount will be spent by the shipping board in playgrounds, parks and other modern city improvements. The government will also undertake the construction of street-car line extensions at a cost of $125,000. Shipworkers will be given an opportunity to buy their homes with the condition that two years after peace is declared there may be a reappraisement, and if the value of the property has decreased, the final payment may be made at the latter value.

LEGAL NOTES

A Summary and Notes of Recent Decisions—Rulings of Interest to Municipalities

Police Pensions—Removal.

(Iowa) Under Code Supp. 1913, §932j et seq., order of trustees of pension fund of city of Des Moines removing member from police pension roll because awarded compensation for injuries under Workmen's Compensation Act held improper.—Dickey v. Jackson, 165 N. W. 387.

If city resisted injured police officer's claim for compensation under Workmen's Compensation Act on ground he had been placed on roll of police pension fund its remedy was to raise question in proceeding for compensation, and not to remove member from pension roll.—Id.

Poor Pavement—Time Limit in Action.

(Iowa) Code, § 989, providing no action shall be brought questioning street improvement or sewer certificates or bonds after three months from order of issuance, is applicable to suit by property owner to enjoin collection of special assessment for paving on ground work was poorly done and has become fraud on owner.—Plagman v. City of Davenport, 165 N. W. 393.

Picketing—Municipal Ordinance—Conspiracy.

(Or.) Municipal ordinance declaring that to loiter or parade back and forth, or cause any person or persons to so parade in front of or in vicinity of any store, factory, etc., shall be prima facie evidence of conspiracy to injure business patrolled, is invalid; such facts having no tendency to establish such conspiracy.—Hall v. Johnson, 169 P. 515.

(1) (Or.) Municipal ordinance directed against conspiracies to injure trade, business, or commerce, and providing penalty for violation thereof, has no extramural effect, is not invalid on ground that it is not local municipal legislation.—Hall v. Johnson, 169 P. 515.

Building Regulation—Police Power.

(W. Va.) A limitation upon an owner's use of city property cannot be imposed by law for the benefit of other property owners.—State v. Stahlman, 94 S. E. 497.

(W. Va.) Under charter provision authorizing city "to regulate the height, construction, and inspection" of new buildings, it could not prevent owner of lot in built-up section, between three and four-story buildings, from erecting a one-story building, by refusal of a permit to erect it.—State v. Stahlman, 94 S. E. 497.

Charter, authorizing city "to regulate the height, construction, and inspection" of buildings, confers authority respecting the height of buildings only to limit or restrict it for the safety of persons and property.—Id.

(W. Va.) Prevention f erection of buildings in city, lower than adjacent buildings, has no such tendency to prevent danger from fire as would justify or validate such act under state's police power.—State v. Stahlman, 94 S. E. 497.

Street Grade—Ordinance—Established Datum.

(Ill.) Ordinance being basis of all improvements under Local Improvement Act must for purpose of showing respective cost of improvement indicate grade of street to be improved, either on its face or by reference to other ordinances, etc.—City of Staunton v. Bond, 118 N. E. 47.

Establishment of grade of sidewalk is legislative function to be exercised by council, and it cannot be delegated to committee or city official; hence, if ordinance requiring sidewalks does not establish grade, it is fatally defective.—Id.

Grade for sidewalks is sufficiently established for local improvements where improvement ordinance refers to established datum.—Id.

Ordinance held by reference to plats and established datum to sufficiently describe grade of sidewalks.—Id.

Picketing—Police Power.

(Tex. Cr. App.) Ordinance prohibiting walking back and forth or loitering in front of business places, to persuade persons by sign or otherwise from entering to transact business, does not conflict with Rev. St. arts. 5244, 5245, or Pen. Code 1911, art. 1478, allowing formation of labor unions and persuasion of employees.—Ex. parte Stout, 198 S. W. 967.

(Tex. Cr. App.) El Paso charter, § 2, empowering city to protect health, life, and property, and to preserve order and security of city and inhabitants, gave power to prohibit loitering or walking back and forth in front of places of business for purpose of persuading persons from entering.—Ex parte Stout, 198 S. W. 967.

Change of Grade—Damage—Abutting Owner.

(N. Y. Sup.) Though at common law abutting owner is not entitled to recover damages from change of grade in public highway, it is competent for legislature to provide for such compensation.—City of Corning v. O'Neill, 167 N. Y. S. 743.

Though right of access of abutting owner to his premises is covered by Railroad Law, § 92, providing for acquisition of lands and easements by condemnation to eliminate grade crossings, mere change of grade of street or closing it altogether at some point not in front, but beyond the premises, does not entitle him to damages.—Id.

Special Assessments—Benefits.

(Ill.) Under no circumstances, no matter what plan is followed, can property be assessed in special assessment proceeding more than it is specially benefited.—City of Staunton v. Bond, 118 N. E. 47.

Assessment—Railroad Station.

(N. Y. Sup.) Railroad station property, while used for railroad purposes, cannot be assessed for benefits in proceedings for opening and extending a street.—In re Blondell Ave. in City of New York, 167 N. Y. S. 789.

Poor Pavement—Fraud—Assessment.

(Iowa) Merely because concrete pavement is of poor quality, and in seven years has become badly cracked and disintegrated, though cause is doubtful, does not give property owner cause of action to enjoin collection of special assessment for cost of paving on ground of fraud.—Plagman v. City of Davenport, 165 N. W. 393.

Assessment—Illegality.

(U. S. Sup.) Where a special assessment to pay for a particular improvement has been held to be illegal the United States Constitution does not prevent the making of a new and just assessment to pay for the completed work.—Schneider Granite Co. v. Gast Realty & Investment Co., 38 S. Ct. 125.

Motor Vehicle Regulation—Police Power.

(Mo.) Regulation of use on city streets of vehicles such as automobiles which are capable of very rapid movement is within police power reserved to city.—City of St. Louis v. Hammond, 199 S. W. 411.

Public Building—Damage to Property.

(N. Y. Sup.) Where a city appropriated 6¾ feet of a street to build an expensive ornamental front on a public building and shut out light and air of an adjoining landowner without compensation, injunction will not be granted because adequate relief can be afforded by compensatory damages.—Hellinger v. City of New York, 168 N. Y. S. 271.

Motor Vehicle Regulation—Evidence of Speed.

(Ala.) A municipal ordinance regulating traffic on streets is not void for unreasonableness or uncertainty because it fails to provide the rule of evidence that a rate of speed in excess of 30 miles an hour for a distance of a quarter of a mile shall be presumptive evidence of excessive speed as is provided by Acts 1911, p. 642, § 21.—Hood & Wheeler Furniture Co. v. Royal, 76 So. 965.

NEWS OF THE SOCIETIES

CALENDAR OF MEETINGS.

May 27-June 1.—CANADIAN PUBLIC HEALTH ASSOCIATION. Meeting with Ontario Health Officers' Association, Hamilton, Ont. Secretary, J. G. Fitzgerald, Toronto, Ont.

June 4, 5.—PENNSYLVANIA STATE ASSOCIATION OF BOROUGHS. Seventh annual convention, Chamber of Commerce, Pittsburgh, Pa. Secretary, J. Herman Knisely, chief, Bureau of Municipalities, Department of Labor and Industry, Harrisburg, Pa.

June 4-6.—INTERNATIONAL ASSOCIATION OF FIRE ENGINEERS. Annual convention, Chicago, Ill. Secretary, Chief James McFall, P. O. Box 1015, Washington, D. C.

June 4-7.—AMERICAN SOCIETY OF MECHANICAL ENGINEERS. Spring meeting, Worcester, Mass.

June 5-7.—NATIONAL MUNICIPAL LEAGUE. Annual meeting, New York, N. Y. Secretary, Clinton Rogers Woodruff, North American Bldg., Philadelphia, Pa.

June 13, 14.—NATIONAL ELECTRIC LIGHT ASSOCIATION. Annual meeting, Hotel Traymore, Atlantic City, N. J. Secretary, T. C. Martin, 33 West 39th St., New York City.

June 11-13.—MAYORS AND OTHER CITY OFFICIALS OF NEW YORK STATE. Annual conference, Newburgh, N. Y. Secretary, William P. Capes, 25 Washington St., Albany, N. Y.

June 19-21.—NATIONAL ASSOCIATION OF COMPTROLLERS AND ACCOUNTING OFFICERS. Annual meeting, Atlantic City, N. J.

June 19, 20.—LEAGUE OF TEXAS MUNICIPALITIES. Sixth annual convention, in cooperation with the Texas Commercial Executives' Association, San Antonio, Tex. Secretary, Edward T. Paxton, University of Texas, Austin, Tex.

June 24-26.—AMERICAN CONCRETE INSTITUTE. Annual meeting, Atlantic City, N. J.

June 25-28.—AMERICAN SOCIETY FOR TESTING MATERIALS. Annual meeting, Atlantic City, N. J. Secretary-treasurer, Edgar Marburg, University of Pennsylvania, Philadelphia, Pa.

June 26-28.—SOCIETY FOR THE PROMOTION OF ENGINEERING EDUCATION. Annual meeting, Northwestern University, Evanston, Ill.

June 26-28.—AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS. Annual convention, Atlantic City, N. J. Secretary, F. L. Hutchinson, 33 West 39th St., New York City.

American Society of Mechanical Engineers.

The spring meeting of the American Society of Mechanical Engineers will be held this year at Worcester, Mass., June 4 to 7, with headquarters at the Hotel Bancroft. Professional sessions will be held both at the hotel and at the Worcester Polytechnic Institute, and will largely relate to questions with which engineers are now having to deal in connection with the war. The following is an outline of the program:

Tuesday Eve'g, June 4.—Welcome by the mayor and the president of the Chamber of Commerce, with an address on "The Growth of an Industrial City" by Charles G. Washburn (Hotel Bancroft). Reception and musical program at the Worcester Art Museum, followed by dancing.

Wednesday, June 5.—Professional sessions morning and afternoon (Worcester Polytechnic Institute). Papers contributed by the local sections of New England and of the Providence Engineering Society; miscellaneous papers on technical subjects; a paper on "Safety Education in Technical Schools and Universities."

General war session, evening (Hotel Bancroft). Addresses on the "Procurement Program of the Government," after which the party will adjourn to the roof garden.

Thursday, June 6.—Special sessions, morning (Worcester Polytechnic Institute). "Fuel Economy," "Vocational Training" and general engineering subjects.

Luncheon will be served at the Norton Company's plant, where a brief session will be held in the afternoon, after which there will be an inspection of the interesting community housing and garden projects of this company.

Dinner at the Worcester Country Club, with a lecture on "Harvard's Contribution to Astronomy" by Dr. S. I. Bailey, followed by dancing.

Friday, June 7.—This day is reserved for an automobile trip to Camp Devens via Clinton Dam; lunch at Camp Devens; continuation of the trip to Concord and Lexington, returning via the Wayside Inn.

The following papers will be among those presented: "The Public Interest as the Bedrock of Professional Practice," Morris L. Cooke; "Moisture Reabsorption of Air-Dried Douglas Fir and Hard Pine, and the Effect on the Compressive Strengths," Irving H. Cowdrey; "A High-Speed Air and Gas Washer," Lieutenant J. L. Alden; "Efficiency of Gear Drives," C. M. Allen and F. W. Roys; "Some Economic Aspects of Fire Protection," J. Donald Pryor and Frank V. Sackett; "Self-Adjusting Spring-Thrust Bearing," H. G. Reist; "Stresses in Machine When Starting or Stopping," F. Hymans; "An Investigation of the Fuel Problem in the Middle West," A. A. Potter; "Oil Fuel in New England Power Plants," H. W. Ballou; "Problems and Hazards in War Times."

National Fire Protection Association.

The fire prevention and protection aspects of the war work of the nation were the most important subjects taken up at the principal session of the twenty-second annual convention of the National Fire Protection Association, held in Chicago May 9-11.

Past president Merrill, who is now chairman of the Fire Prevention Section of the War Industries Board of the National Council of Defense, described the work of his committee; W. E. Mallalieu, general manager of the National Board of Fire Underwriters, sent a paper recording the accomplishments of the national board for the national government since war was declared, and Professor Woolson's committee reported upon emergency housing legislation. These were the chief war subjects on the program.

In spite of the war service of many members attendance was good. For the first time in its history the N. F. P. A. has more than three thousand members. This increase in membership was made in the latter part of the last association year after there had been a considerable decrease following enlistment of members in the national services.

At a luncheon arranged by the Chicago chapter of the N. F. P. A. on Friday the principal address was delivered by the dean of the Armour Institute of Technology. The delegates visited the underwriters' laboratories Wednesday afternoon. Engineers of the laboratories explained operations for tests of various devices and materials, and for the special benefit of the visitors a column test was conducted in the new testing department of the laboratories.

Former president Merrill, in his speech, said that there are ten airplane factories and one hundred munition plants in the United States that have an extremely serious fire hazard. The committee considers any place where materials for the government are being handled, stored or manufactured as a munition plant. The Fire Prevention Section will call attention of government departments giving out contracts to lack of fire protection in munition plants where the hazard is serious, and the plan will be to insert clauses in renewal contracts calling for what fire protection the federal government may consider necessary. The Fire Prevention Section has fire safety jurisdiction over all material used for war purposes, wherever manufactured, handled or stored. The section is now asking for volunteers from the fire protection engineers of the country, who will be asked to make careful examinations into the fire protection of all munition plants in the country. It is planned that these engineers shall go to Washington for two weeks, where they will be carefully instructed as to their duty and as to the exact information desired by the Fire Prevention Section. The chief purpose of the inspections will be to bring before the section such definite and clear information as to hazards and as to methods of correcting these hazards that the committee may give specific instruction and orders from Washington.

Efficiency of the work done to promote fire safety by the National Board of Fire Underwriters was shown in the paper prepared by W. E. Mallalieu, its general manager, and presented by Ira H. Woolson, consulting engineer. During the construction period an engineer of the national board was present at every army cantonment, examining into the water supply, fire

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INDUSTRIAL NEWS

Steel Products and Cast Iron Pipe.—Judge E. H. Gary, chairman of the committee on steel and steel products of the American Iron and Steel Institute, has announced a number of changes in the maximum prices on iron and steel products, as published in the institute booklet last January. The committee has received from a sub-committee reports based on information received from representative manufacturers of various lines of steel and steel products, and from such reports and other data available the committee has concluded that certain changes and modifications in the maximum prices, differentials, extras, etc., as heretofore recommended by the institute and published in its pamphlet dated January, 1918, are fair and reasonable, and the committee recommends that revised maximum prices, differentials and extras be adopted, to take effect immediately. In some cases, as in that of scrap, on which numerous changes were announced in a supplement to the booklet, minor changes in the way of safeguards are announced. In the case of pig iron a statement intended to make clear the meaning of the institute as to base price is inserted and the 10 per cent. per gross ton above price of basic added to Bessemer is made to apply to Bessemer iron up to 3 per cent. silicon. In low phosphorus pig iron, copper bearing iron, with copper not exceeding 0.25, the price is $19 per gross ton above base instead of $17 as heretofore. On cast iron water pipe the Birmingham price is raised from $49 in the booklet to $55; the New York price from $55.35 to $61.35, and the Chicago price from $54.35 to $60.35.

These prices are for 6-inch, Class B and heavier. On 4-inch the prices would be $3 more per ton and on Class A $1 extra on all prices.

The iron and steel industry is concerned with the problem of maintaining present operations more than with the problem of increasing them. Efforts will be made to curtail the decline in output that usually occurs in the hot weather. Pig iron and steel supplies are almost entirely shut off from industries that are not directly helpful toward winning the war, and jobbers are in substantially the same position. The present condition, however, is regarded as largely temporary. As a result of the recent meeting in New York, when the Director of Steel Supplies, J. Leonard Replogle, called for a maximum diversion of steel to the filling of war orders, a 100 per cent. war service had been pledged; but it is not definitely known that this 100 per cent. is really required, even for a short period. That question is being worked out by the joint committee representing the government and the steel manufacturers, just appointed. It will determine, and probably in a very short time, what the steel supplies are going to be and what the requirements of the war activities, month by month, are. On this committee are J. A. Farrell, president of the United States Steel Corporation; E. G. Grace, president of the Bethlehem Steel Corporation; H. G. Dalton of the Pickands-Mather Company; J. A. Topping, chairman of the board of the Republic Iron and Steel Company, and E. A. S. Clarke, president of the Lackawanna Steel Company, all representing the steel interests, and these members of the War Industries Board: Alexander Legge, J. L. Replogle and General Hugh L. Johnson.

There has been a determined agitation to have the government commandeer the steel plants and take complete supervision of the output, but some officials have argued that this course would not bring about more favorable results than the present system of private operation. As the matter stands there is little likelihood that drastic steps will be taken until the joint committee has reported and the whole matter has been placed before the "Super-War Council."

Exhibitors at St. Louis Water Works Convention.

The Water Works Manufacturers' Association was very fully represented in the exhibit room, but three or four failing to occupy the spaces assigned to them. On account of war conditions the exhibits were restricted in weight to 50 lbs. each, and on tables in the small booths provided were displayed the literature of the companies, models and small samples. The expressions of satisfaction with this sort of exhibit were numerous among exhibitors and visitors, perhaps enough to warrant a continuance of the policy. While the exhibit hall was at the other end of the building from the convention hall, it was on the same floor and the attendance was good.

The exhibitors included the following:

American Bitumastic Enamels Co., 17 Battery Place, New York. Hermastic coatings a protection for water pipe, tanks, stand-pipes, concrete structures and other parts of hydraulic plants.

Allis-Chalmers Mfg. Co., West Allis and Milwaukee, Wis. Its only exhibits were the four 30,000,000-gal. vertical compound pumping engines at the Chain of Rocks pumping station of the St. Louis water works; the six triple-expansion high-duty engines at the Baden station with a total capacity of 80 million gallons a day; and the three vertical triple-expansion high-duty, 20,000,000-gal. pumping engines at Bissell's Point.

Badger Meter Mfg. Co., Milwaukee, Wis. A sample water meter and blueprint circulars showing section of the meter and connections. The theory on which the meter has been constructed is that every part shall be as strong as the other; that is, every point but one; the bottom is a plate of soft gray cast iron, thoroughly galvanized, and rust proof, with breaking strength of only 600 lbs., so that if the meter freezes the bottom plate will break before anything else is unduly strained. This bottom is replaced at a cost of a few cents and the meter is as good as new.

Birch-Hentz Mfg. Co., 1100 S. Kilbourn avenue, Chicago, Ill. Pump valves.

Buffalo Meter Co., 2917 Main St., Buffalo, N. Y. American and Niagara water meters in sizes from ⅝ x ½ in. to 3 in. The measuring chamber is of large capacity and the measuring disc is of hard rubber with metallic plate reinforcement. When a Niagara meter is frozen, usually the upper half of the outer case breaks, relieving the inner parts from strain. This half for the ⅝-in. case costs but 60 cents for replacing the broken part. When an American meter freezes the dome of the bronze top springs upward, relieving pressure on other parts. It may be easily pressed back and the top used over again. The only difference between the three meters made by the company is in the cases. Curb boxes, sealable vertical pipe meter connections, jet meter for filling sewer flush tanks, pocket meter-reading books, meter record-books, and loose-leaf ledgers for meter accounts are made by the company.

Builders' Iron Foundry, Providence, R. I. Venturi meters.

Central Foundry Co., New York. Universal cast-iron pipe.

Chicago Bridge and Iron Works, Chicago, Ill. Steel tanks and towers.

H. W. Clark & Co., Mattoon, Ill. Clark meter box, Clark coupling yoke for meter setting on riser pipes and slotted openings for service pipe, water-meter tester, leak indicator, service and valve-box finder, wireless pipe-locator, sonophone, service and valve boxes, valve housings, collapsible forms for casting concrete box-bodies, and a full line of municipal castings.

E. I. du Pont de Nemours & Co., 35th and Gray's Ferry Road, Philadelphia, Pa., Harrison Works. Chemicals.

East Jersey Pipe Corporation, Fulton and Church Sts., New York City. Works at Paterson, N. J. Lock bar steel pipe.

Electro Bleaching Gas Co., 18 E. 41st St., New York City. Plant at Niagara Falls, N. Y. Manufacturers of liquid chloride and of apparatus for applying it to the sterilization of water supplies. Wallace & Tiernan Co., contractors, New York, instal outfits.

Ford Meter Box Co., Wabash, Ind. Meter box and setting.

Glauber Brass Manufacturing Co., Cleveland, O., had a full line of samples of couplings, cocks, valves, goosenecks, branch connections and information about their tapping machine.

Hays Mfg. Co., Pa. Curb, service and stop boxes; drilling machine.

Hersey Manufacturing Co., E and 2d Sts., South Boston, Mass., showed two sectional models of meters. The three models of disc meters have the Hersey anti-frost bottoms in the form of a copper-lined cast iron bottom with a groove cut to a fixed depth which always breaks under frost pressure and relieves all of the working parts from damage.

Modern Iron Works, Quincy, Ill., showed a model of their water-meter housing, meter yoke and connection, valve stems for shut-off cocks, detecta-leak (audiphone), etc. The company also supplies the Taylor portable steel derrick for lifting and handling pipe and construction materials, flow regulators for flush-tanks and like constant flows of water, valve boxes, gate valves, hydrants, indicator posts, repair

lids, manhole covers, tool carts, street cleaners' carts and scrapers gages, revolution counters, liquid-level recorders, pipe locator, dip needle, service boxes, shut-off rods and keys, corporation cocks, lead-flange couplings and tools, goose-necks, gate valves, tapping machines, diaphragm pumps, pipe clamp and plugs, lead melting furnace, pipe wrench, pipe vise, stand and bender, tool kit, pipe cutters and drills, pipe pusher, pressure regulators, electro hydraulic valve, in short, anything which the water works engineer needs for his daily construction and maintenance work.

H. Mueller Mfg. Co., Decatur, Ill. Lead flanging machine and plumbers' goods.

National Water Main Cleaning Co., New York. Apparatus for cleaning water mains.

New York-Continental-Jewell Filtration Co., Nutley, N. J.

Pennsylvania Salt Manufacturing Co., Philadelphia, Pa., materials for treatment of water, including hypochlorite of lime or chlorinated lime, natrona crushed block sulphate of alumina, crushed excelsior sulphate of alumina, lump ammonia alum, and a Keystone made of pure white sulphate of alumina.

The Pitometer Company, 25 Elm St., New York. The Cole recording pitometer was the principal exhibit.

Pittsburgh Filter Mfg. Co., Pittsburgh, Pa. Books of photographs of plants in which this company's filters have been constructed.

The Pittsburgh Meter Co., E. Pittsburgh, Pa., showed sectional models of Keystone and Eureka water meters. The case of the former is slightly distorted should the meter freeze, which distortion is easily corrected and the meter put back into service again, though it is sufficient to prevent injury to the operating parts by the freezing.

R. U. V. Co., 120 Broadway, New York. Ultra-violet ray system of water sterilization and apparatus for the same.

A. P. Smith Mfg. Co., East Orange, N. J., showed a model of the Smith hydrant for high and low pressures and Kellogg patent plug, and photographs of machines in operation.

Sullivan Machine Co., 122 S. Michigan Ave., Chicago, Ill., distributed pamphlets descriptive of the Sullivan air-lift pumping system with the component air compressors, boosters, foot pieces, well tops, which they manufacture.

Thomson Meter Co., Brooklyn, N. Y., showed the Lambert disc, current and duplex meters.

United States Cast Iron Pipe and Foundry Co., New York.

Wallace and Tiernan Co., New York. Contractors for water sterilization plants.

The members of the Meter Manufacturers' Exchange distributed at their exhibits the advertising literature of the Exchange, which is a common publicity agent, "Are You Selling Water," "Saves Coal, Oil, Labor, Machinery," "Business Policy" and monthly booklets, "What Leaks Are Costing You Every Day" for April, and "How Long Are You Going to Keep It Up," for May.

The Association of Waterworks Manufacturers elected J. C. Clifford, of the Pittsburgh Meter Co., president; E. D. Kingsley, of the Electro-Bleaching Gas Co., vice-president; C. R. Wood, of R. D. Wood & Co., treasurer, and John A. Kienle, Electro-Bleaching Gas Co., secretary.

NEWS OF THE SOCIETIES

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department services, alarm system, heating and lighting arrangements, possibilities of local assistance in fire fighting and exposure hazards. In all these cases national board engineers were carrying out plans which had been carefully prepared in the offices of the army quartermaster general before construction of army cantonments was begun. It is a remarkable record, that of construction valued at $100,000,000 the loss from the time construction began until cantonments were turned over to the government was but $2,150. Inspection services of national board representatives have not been confined to cantonments. These men have also inspected as many as one hundred and sixty shipyards and many other plants owned or used by the national government.

The association, in declaring "warfare against the needless sacrifice of human lives and property by fire," advocates the following measures:

1. The adoption by municipalities of the Standard Building Code of the National Board of Fire Underwriters to the end that fire-resistive building construction may be encouraged, the use of inflammable roof coverings prohibited, adequate exit facilities from buildings assured, and interior so designed and fire-stopped as to make easy the extinguishment of fires therein.
2. The adoption by all states of minimum building requirements for the protection of state and county hospitals, schools, asylums and similar institutions outside city limits and of small communities in which the establishment and enforcement of a building code is impracticable.
3. The enactment by each state of the fire marshal law advocated by the Fire Marshals' Association of North America to the end that official investigation may be made of the causes of all fires, preventable fires may be eliminated by public education, and the crime of arson stamped out.
4. The adoption of the association's suggested ordinance providing for the systematic inspection of all buildings by city fire marshals or local firemen to insure the vigorous enforcement of rules for cleanliness, good housekeeping, and the maintenance of safe and unobstructed exits, fire-fighting apparatus, and other protective devices.
5. The enactment of ordinances similar to that of Cleveland, Ohio, fixing the cost of extinguishing preventable fires upon citizens disregarding fire prevention orders, and a more general legal recognition of the common law principle of personal liability for damage resulting from fires due to carelessness or neglect.
6. The wider general use of the automatic sprinkler as a fire extinguishing agent and life saver, and the more general adoption of the fire division wall as an important life saving exit facility.
7. A careful study of the technical surveys of cities made by the engineers of the Committee on Fire Prevention of the National Board of Fire Underwriters covering the items of water supplies, their adequacy and reliability, fire department efficiency, fire alarm systems and conflagration hazards, and of the possibility of co-operation among neighboring cities through mutual aid, and the standardization of hose couplings.
8. The adoption of the association's suggested laws and ordinances for state and municipal regulation of the transportation, storage and use of inflammable liquids and explosives.
9. The universal adoption and use of the safety match and legislation prohibiting smoking in all parts of factories, industrial and mercantile buildings except in such fire-proof rooms as may be especially approved for the purpose by fire departments.
10. The education of children and the public generally in careful habits regarding the use of fire.
11. The co-ordination of all these activities through a central administrative officer or body of the state or city having primary jurisdiction, for the purpose of promoting uniformity of action and efficient co-operation.

The association elected the following new officers: President, F. J. T. Stewart, New York; first vice-president, H. O. Lacount, Boston; second vice-president, W. E. Mallalieu, New York; secretary-treasurer, Franklin H. Wentworth, Boston; executive committee, Gorham Dana, Boston; H. W. Forster, Philadelphia; Rudolph P. Miller, New York; H. L. Phillips, Hartford; A. R. Small, Chicago; John B. Laidlaw, Toronto (one year).

PROBLEMS CITIES ARE STUDYING WITH EXPERTS

SEWERS AND WATER WORKS SYSTEMS are to be built by Ogilvie, Minn. The engineer for the work is J. F. Druar.

An ELECTRIC LIGHT PLANT is to be built by Burns, Kans. The improvement was planned by the engineering firm of Archer & Stevens.

Richmond, Mo., is to improve its WATERWORKS. Plans are in process of preparation by the consulting engineer, W. Kiersted.

Salt Lake City, Utah, through its civic planning commission, is to begin the preparation of a CITY PLAN and a program of city improvement. George E. Kessler has been engaged as expert.

Rochester, N. H., is to make PAVING IMPROVEMENTS. The engineer for the work is William A. Grover.

The Modesto and Turlock Irrigation district, Cal., is to build a DAM on its reservoir site. A. J. Wiley has been retained as engineer for the structure.

The borough of Donora, Pa., is to make PAVING IMPROVEMENTS. The engineering firm of Chaney & Armstrong has completed plans for the work.

St. Louis, Mo., is considering the question of allowing the local TELEPHONE company to increase its RATES. The city has retained J. E. Allison as its expert to investigate the finances of the company.